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SUMMARY OF RECENT ABSTRACTS *

V. LEISHMANIASIS†

General

PETRISHCHEVA (p. 855) has issued a monograph on sandflies in the Soviet Union, which is largely concerned with control. Marking experiments show that their range of flight is restricted normally to less than 25 metres except in semi-desert conditions where it may be up to 1½ kilometres. Control measures may therefore be concentrated for 2–3 kilometres around new settlements, and on isolated foci of leishmaniasis.

Visceral

Epidemiology: Aetiology

Visceral leishmaniasis is endemic in parts of Portugal, and RÉS (p. 110) shows that *Phlebotomus perniciosus* is the predominant vector species, with *P. papatasi*, *P. sergenti* and *P. ariasi*. In the middle Douro region, the most important focus, the antimalarial campaign with insecticides has not affected the incidence of leishmaniasis.

BERBERIAN (p. 460) found kala azar in children in a village of north Syria, and showed that dogs there were also affected. In Beirut mongrel dogs were free though pedigree dogs were infected, and the author suggests that immunity may be acquired by exposure to non-virulent strains (of animal origin).

Kala azar and oriental sore have both been reported from south-east Kashmir, and MITRA (p. 110) found *P. sergenti*, *P. chinensis* and *P. papatasi* (and 4 other species) there; they were captured only from May to October, when temperatures were fairly high.

HASEEB (p. 459) gives an account of the history of leishmaniasis in the Sudan where kala azar is endemic in certain areas bordering Ethiopia, and sporadic in the south and in parts of Darfur and the Nuba mountains. Oriental sore is

* The information from which this series of summaries has been compiled is given in the abstracts which have appeared in the *Tropical Diseases Bulletin*, 1960, v. 57. References to the abstracts are given under the names of the authors quoted and the pages on which the abstracts are printed.

† For previous articles on leishmaniasis in this series, see the June issues of the *Tropical Diseases Bulletin* each year since 1939.

also found, and *P. papatasi* is probably the chief vector in the north. The problem of animal reservoirs of leishmaniasis has not yet been solved.

MEIRA LINS (p. 356) reports cases of visceral leishmaniasis in children in Pernambuco, and discusses diagnosis. Visceral leishmaniasis occurs in Minas Gerais, and DE OLIVEIRA *et al.* (p. 693) found the infection in dogs; about 5% were positive to the complement-fixation test and in about 2% leishmaniae were found. The chief vector was considered to be *P. longipalpis*, but other sandflies were suspected. DEANE (p. 1253) sums up the epidemiology of kala azar in the Americas; it occurs in many countries there, but especially Brazil, where it may be epidemic in the foothills of Ceará, affecting children most commonly. The wild animal reservoir is the "fox" *Lycalopex vetulus*, and the domestic reservoir is the dog (especially in towns). In Brazil the chief vector is *P. longipalpis*. Control has been achieved with DDT and the destruction of affected dogs, and treatment of patients.

CHATTERJEE and GHOSH (p. 460) report a study of the metabolism of *Leishmania donovani*, but for details the original should be consulted. They (p. 572) observed that the organism assimilates carbon dioxide in certain substrates, and discuss the implications of this finding. Nystatin inhibits some metabolic activities of *L. donovani* to a high degree and in high dilution; GHOSH *et al.* (p. 1034) are investigating the mechanism of this action.

Pathology: Clinical Features: Treatment

SEN GUPTA and CHATTERJI (p. 1035) made a histopathological study of spleens removed from patients with kala azar who had not responded to chemotherapy. The reaction of the human host to leishmanial infection is proliferation and accumulation of histiocytes, and granulomata found in the spleen were evidence of this. There were haemopoietic foci in the spleen which were probably the result of inadequate haemopoiesis in the marrow and which, as Woodruff remarks in comment, provide an argument for very careful selection of such patients for splenectomy.

Coexistence of malaria and kala azar is not often recorded, but BLANC *et al.* (p. 1152) think that this may be the result of faulty diagnosis, since the endemic areas overlap and there is no evidence of antagonism between the two infections. Kala azar is easily missed in patients found to have malaria parasites, since the appropriate examinations are not then usually made. Revision of diagnosis should be made when treatment for one of the diseases is unsuccessful, and in areas where overlap occurs simultaneous examinations of blood and bone marrow should be carried out.

NUSSENZWEIG (p. 573) found that the complement-fixation test with an antigen from tubercle bacilli was positive in kala azar, the titre rising as the disease progressed and running parallel with the degree of enlargement of spleen and liver. Successful treatment reduced the titre. A zone phenomenon was observed, and the author suggests that there may be 2 antibodies in the serum, one which fixes complement and another which blocks the reaction. PELLEGRINO and his colleagues (p. 461 *ter*) use blood taken up by filter paper, and dried, for the complement-fixation test with an antigen derived from the tubercle bacillus. In this way they found infected dogs in Minas Gerais, but note that dogs infected with *T. cruzi* also gave positive results, and that the test with a *T. cruzi* antigen may be positive in dogs with leishmaniasis. Sera from infected persons gave positive results with the antigen from tubercle

bacilli, but so also did sera from persons with acute (but not chronic) Chagas's disease; lepromatous leprosy and tuberculosis may also give cross-reactions.

The Montenegro skin test with an antigen from *L. brasiliensis* is positive in South American mucocutaneous leishmaniasis but negative in Brazilian kala azar; MANSON-BAHR *et al.* (p. 693) tried it in East Africa, finding it positive in East African kala azar and generally negative in a few normal controls. They suggest that the Brazilian race of *L. donovani* must differ biologically from the African and Indian races. The test should prove important in revealing latent, active and cured disease.

SYMMERS (p. 1033) describes a case of leishmaniasis in which a woman (who had never been out of the British Isles) developed a papule behind the vaginal orifice which at first was diagnosed as syphilitic. This did not respond to penicillin and eventually leishmaniae were found in a biopsy specimen. The woman's husband had had kala azar while in the Sudan, which had not been cured by treatment, and both patients responded to routine treatment for that disease. There is no doubt that the disease was transmitted by contagion, but the diagnosis was complicated by a positive Wassermann reaction and a rash, both provoked by the penicillin treatment; the Kahn was negative.

BONEBAKKAR (p. 1151) describes a case of visceral leishmaniasis in a Dutch sailor who probably acquired it in India and in whom the incubation period was $1\frac{1}{2}$ years. The patient had progressive loss of weight, fever with double peaks, brown pigmentation, enlargement of spleen and liver, and anaemia with leucopenia. Treatment with glucantime was very successful. WRIGHT (p. 233) reports a case of kala azar in which the incubation period could not have been less than 9 years, one of the longest ever recorded. The illness was associated with agammaglobulinaemia and amyloid disease.

In north-east Brazil leishmaniasis is largely a disease of children, thus resembling Mediterranean kala azar; DE ALENCAR (p. 890) gives an account of the clinical course of the disease, which shows the usual features of fever, enlargement of liver and spleen, polyadenitis, anaemia, leucopenia and reduction of platelets, ascites, oedema and icterus.

In tests of therapeutic activity against visceral leishmaniasis in hamsters and mice CAPPUCCINO and STAUBER (p. 111) found amphotericin B and its soluble derivative Fungizone particularly active; various other antibiotics and other compounds were also useful.

CUTANEOUS AND MUCOCUTANEOUS

Oriental Sore

DI STEFANO *et al.* (p. 1035) point out that the incidence of cutaneous leishmaniasis in the Abruzzi increased during and after the Second World War, but that treatment from special centres quickly reduced it. There were very few cases of visceral leishmaniasis. Most of the cutaneous lesions were on the face and limbs (distally as a rule). Treatment was given with mepacrine and glucantime.

DAOUD and SCHWABE (p. 1108) found that 46 of 51 Lebanese or Syrians with scars of cutaneous leishmaniasis gave positive results to a skin test with an antigen prepared from *L. tropica*. There was no cross-reaction with toxoplasmin.

VINGIANI (p. 891) in Naples found changes in the epithelial layers in oriental sore which ranged from simple thickening to proliferation of epitheliomatous

type. When healing took place the lesion was sloughed off and replaced by scar tissue.

DEGTYAREVA and ZASUKHIN (p. 1152) inoculated leptomonad forms of *L. tropica* into tissue cultures of various kinds, and observed that the flagellates invaded the cells and were transformed into leishmanial forms multiplying by binary fission.

Mucocutaneous, etc.

A list of *Phlebotomus* species which have been found infected with *L. brasiliensis* in South America, with notes on their biological features, is given by FORATTINI (p. 357). PIFANO *et al.* (p. 357) show that female *P. panamensis*, captured in Venezuela, produced cutaneous leishmaniasis in 1 person out of 7 who allowed themselves to be bitten.

MEDINA and ROMERO (p. 694) describe a strain of leishmania found at different times in 3 patients in different parts of Venezuela; the disease was mild and characterized by alternating periods of cutaneous eruptions and their temporary healing. Leishmaniae were abundant in lesions and were also present in healthy skin and blood; the Montenegro reaction was usually weak or negative. The parasite differs from *L. brasiliensis* in several respects, and is referred to as a new subspecies, *L. brasiliensis pifanoi*.

CONVIT *et al.* (p. 695) describe a new type of cutaneous leishmaniasis from Venezuela, which differs from the other forms. It begins as a localized ulcer and spreads as skin eruptions (probably as a result of spread by blood vessels) which become nodules covering almost the whole skin and resembling those of leprosy. Parasites are abundant in smears from the lesions and can be found in the blood. The Montenegro reaction is negative.

ROTBERG (p. 1036) describes a case of lichenoid and hypochromic lesions in a patient who had had American leishmaniasis.

The recognized treatment of American dermal leishmaniasis with stibophen is troublesome in that it involves repeated injections, and there is a tendency to relapse; HOEKENGA and TUCKER (p. 22) have tried a preparation of tartar emetic which, when given by mouth, has a prolonged absorption time. It is well tolerated and absorbed, and has shown promise in 3 cases.

DEMINA and KELLINA (p. 1153) succeeded in infecting guineapigs with culture forms and leishmanial forms of *L. enriettii*, but only when these were injected intradermally.

Charles Wilcocks

MALARIA

In this section abstracts are arranged as far as possible in the following order:—Human malaria—*epidemiology, aetiology, transmission, pathology, diagnosis, clinical findings, treatment, control;* Animal malaria—*monkeys, other animals, birds.*

BURGESS, R. W. **Comparative Susceptibility of** *Anopheles gambiae* **Theo. and** *Anopheles melas* **Giles to Infection by** *Plasmodium falciparum* **in Liberia, West Africa.** *Amer. J. Trop. Med. & Hyg.* 1960, Nov., v. 9, No. 6, 652–5.

Colonies of *Anopheles gambiae* and *A. melas* were reared in the laboratory, by means of distilled water and 0·5% salt solution respectively. Groups of 50 to 60 adults, about 5 to 8 days old, were fed on 12 Africans with *Plasmodium falciparum* gametocyte counts ranging from 69 to 2,310 per cc. Several of the patients were young children, the rest adults; after the single mosquito feed, they were given antimalarial drugs.

The mosquitoes were kept in 1 ft. cube net cages, dampened by moist towels. After 6 to 8 days they were dissected and examined for stomach infections. A few were kept for gland dissections; but not many of the *A. melas* survived long enough for this.

The results of simultaneous feeds with *A. gambiae* and *A. melas* showed that, in all cases but one, the numbers actually taking blood meals were higher in the former (ratio 100:60). Also the percentage positive and number of cysts per gut were higher in *A. gambiae* than in *A. melas* (83% and 65% positive, respectively; and 49 and 37 cysts/gut).

These laboratory results support field data suggesting that *A. gambiae* is the more efficient vector. Thus GELFAND [this *Bulletin*, 1956, v. 53, 533] found sporozoite rates of 1·4% for *A. melas* and 5·7% for *A. gambiae* in Liberia.

J. R. Busvine

JEFFERY, G. M. **Infectivity to Mosquitoes of** *Plasmodium vivax* **and** *Plasmodium falciparum* **under Various Conditions.** *Amer. J. Trop. Med. & Hyg.* 1960, May, v. 9, No. 3, 315–20. [21 refs.]

This useful paper summarizes the factors influencing infectivity to mosquitoes of *Plasmodium vivax* (Chesson strain) and *P. falciparum* (1 Panama and 2 South Carolina strains) firstly in relation to the stage of the infection in man and secondly after treatment with drugs. In *P. vivax*, mosquitoes became infected on an average on the fourth day of parasitaemia (often before gametocytes became visible and before the first obvious paroxysm of fever); thereafter infection of the mosquitoes varied—some hosts proved to be good and others bad infectors, and waves of infectivity occurred, the first appearing about the 7th day and the next between the 13th and the 23rd; clinical relapses were usually highly infective to mosquitoes. In *P. faciparum*, infectivity is delayed until the first wave of gametocytes begins, on about the 11th day of parasitaemia; infectivity continues for several months while symptoms persist, and later during the terminal asymptomatic parasitaemia up to 503 days for the Panama and 480 days for the South Carolina strains.

Chloroquine has no immediate effect on the gametocytes of *P. falciparum*

and mosquitoes proved to be infectable 20 days after administration of 1·5 gm. of the drug; on the contrary this drug sterilizes *P. vivax* within 4 days. Paludrine [proguanil] renders *P. falciparum* non-infective for 2–7 days. Pyrimethamine has a strong sporontocidal effect (except when resistance has developed in certain strains of *P. vivax* or *P. falciparum*). Primaquine is probably the most promising drug for inhibiting infectivity, because it causes the rapid loss of viability of the gametocytes of *P. falciparum* even within a day of administration, and in low doses (30–90 mgm. in 1 to 3 days).

P. C. C. Garnham

WEED, R., EBER, J. & ROTHSTEIN, A. **Effects of Primaquine and other Related Compounds on the Red Blood Cell Membrane. I. Na+ and K+ Permeability in Normal Human Cells.** *J. Clin. Investigation.* 1961, Jan., v. 40, No. 1, 130–39, 5 figs. [41 refs.]

———. **Effects of Primaquine on the Red Blood Cell Membrane. II. K+ Permeability in Glucose-6-Phosphate Dehydrogenase Deficient Erythrocytes.** *Ibid.*, 140–43, 1 fig. [10 refs.]

REID, I. S. **Overdosage of Camoquin.** *Papua & New Guinea Med. J.* Port Moresby. 1960, July, v. 4, No. 2, 65–6.

The danger of overdosage with such a bitter drug as amodiaquine is small, but where it is marketed in sweetened form there is a possibility of accidental overdosage, especially in children.

This paper records such an accident in a European female twin aged 2½ who was accustomed to taking prophylactic amodiaquine tablets which she called "lollies". The history, 15 hours before admission to Mapamoiwa Hospital, Milne Bay District, was as follows.

The mother found both twins with an open bottle of Camoquin (infant formula), from which some tablets had been eaten and others strewn on the floor. The mother caused the children to vomit and the female twin C vomited fragments of tablets, while the other did not; it was estimated that C had retained 5–8 tablets. On going to bed 1½ hours later C fell asleep; she woke within an hour, but 15 minutes later began to talk irrationally and showed marked restlessness which lasted for 3 hours, after which she gradually lapsed into a semi-comatose state. 9 hours after ingestion of the tablets she had a convulsion lasting 30 seconds and then became more deeply comatose with minor "shudders". On the 2½-hour sea journey to Mapamoiwa she had another convulsion. On admission her temperature and pulse were raised, the pupils were small and reacted sluggishly and muscle tone in the limbs was slightly increased. Her conscious state remained unchanged for 8 hours, when she took some fluids, tried to sit up, but did not recognize her father; she then lapsed into unconsciousness again. 24 hours after admission she woke, conversed rationally, but slept most of the day. Next day she was languid but fit for discharge. The next day yellow pigmentation was seen on the palms and soles; this faded after 4 days and the child was reported normal. No drugs were given and hydration was controlled by oral fluids.

H. J. O'D. Burke-Gaffney

LAHON, H., DE SMET, M. & BOETS, L. Résultats de 5 années de chimioprophylaxie de masse à la Pyriméthamine (Yangambi, 1955–1960). **[Results of 5 Years of Mass Chemoprophylaxis with Pyrimethamine in Yangambi, Congo]** *Ann. Soc. Belge de Méd. Trop.* 1960, Aug. 31, v. 40, No. 4, 651–73, 2 graphs, [Numerous refs.] Discussion 673–4.

This paper describes the results obtained between 1955 and 1960 in the chemoprophylaxis of malaria with pyrimethamine (Daraprim) in a highly malarious area of the Congo.

The headquarters of the Congo Institute for Agronomic Research was at Yangambi on the Congo River about 90 km. down-river from Stanleyville, and about 500 metres above sea level. The labourers employed by the Institute, and their families, made up a total of about 12,000 Africans, of whom 5,500 were children. This population was divided among 12 labourers' settlements of various sizes. Malaria was highly endemic throughout the area, but some settlements were more malarious than others, and there were also seasonal fluctuations; peaks of malaria and of anopheline prevalence occurred in November–December and in April–May owing to river flooding.

Plasmodium falciparum was the only parasite found in local inhabitants, and *Anopheles moucheti* and *A. gambiae* were the only anophelines. *A. moucheti* predominated in the settlements bordering the river, its breeding varying directly with the water level, while *A. gambiae* was more prevalent in camps further from the river, its breeding being dependent on rainfall. For some 5 years before the start of the drug trials, antimosquito measures—both residual spraying and antilarval measures—had been in force and had reduced various malaria indices to some extent; a few ineffective efforts at drug prophylaxis had also been made.

[Table 2 records, among other things, a reduction in positive cord bloods at confinements from 41% to 15·5%. The number examined is not stated, so no comment is possible on these somewhat astonishing figures.]

During 1956–57 preliminary experiments were carried out to determine the most useful dose of pyrimethamine for mass treatment. These included the supervised administration of pyrimethamine in various doses at weekly or 15-day intervals to children and adults, and a comparison between weekly doses of pyrimethamine and weekly doses of nivaquine. [Details of this comparison are insufficient to allow the reader to draw his own conclusions; it is not stated whether the nivaquine dosage represents chloroquine sulphate or chloroquine base.] These experiments indicated that pyrimethamine was effective and non-toxic, and it was decided to start the uninterrupted administration of the drug to all children in the settlements.

For 3 years (1957–60) pyrimethamine was distributed weekly to the children; doses were 6·25 mgm. a week for children less than one month old, 12·5 mgm. a week for children one month to one year, and 25 mgm. a week for children old enough to walk. Distribution was made by the Congolese medical assistants of the various settlements, and the average number of children treated per week was 5,500.

Malaria morbidity in children, which had been about 42% in previous years was 11·3% in 1958 and 5·6% in 1959. Hospital admissions of children for malaria were reduced from 9·1% in 1957 to 2·1% in 1958 and 1·5% in 1959. Most of these were attributed to missed doses. Between May and September

1959, thick blood films were collected from children in different settlements who had been taking regular doses of the drug. Parasite index was 4·5% (17 out of 372), the index at a particularly malarious camp being 10% (out of 50). Newborn infants were left untreated during a period of 6 months, and women received 25 mgm. pyrimethamine a week during the last months of pregnancy. One-third of the infants became infected, most infections occurring within 2 months of birth.

The authors found no evidence of resistance to pyrimethamine developing in local strains of *P. falciparum* during the course of these trials, and consider that their good results may be attributed to this fact.

[The authors say nothing about the incidence of clinical malaria in adults, although the few adult parasite rates mentioned were approximately 50% and the infections in newborn infants indicated a high transmission rate. The age-groups included as "children" are not specified. The trial was carried out in the hope of reducing malaria morbidity and mortality in those treated, and this objective appears to have been achieved so long as regular drug administration could be continued.] *T. Wilson*

World Health Organization. Technical Report Ser. No. 205. **Expert Committee on Malaria. Eighth Report. Geneva, 25–30 July 1960.** 50 pp. [Refs. in footnotes.] 1961. Geneva: Palais des Nations. [Sales agent for U.K., H.M. Stationery Office.] [3s. 6d.; $0.60; Sw.fr. 2.–.]

In this 8th Report, the Expert Committee has again concentrated upon the problems associated with malaria eradication programmes; the 7th Report was reviewed in this *Bulletin*, 1959, v. 56, 921. After noting with satisfaction the substantial progress made towards the ultimate goal of world-wide eradication, the report analyses the various causes of failure to achieve eradication in some areas and suggests ways of preventing such failures in future; it recommends WHO action to assist in a study of the costs of surveillance, in a revision of malaria terminology, and in research on various technical problems.

A malaria eradication programme may fail to achieve its aim in the time scheduled for a number of reasons, which may be technical, operational, or administrative. Among the chief technical reasons, all tending to diminish the effectiveness of spraying campaigns, are the biology and habits of certain vectors, the appearance of resistance to insecticides, and the habits of the human population. Adequate knowledge on all these points is essential. By April 1960 31 anopheline species had been found resistant to one or other of the two groups of chlorinated hydrocarbons, a few being resistant to both groups. Where drug control is relied upon, resistance in parasites may also be an obstacle, and the use of pyrimethamine in medicated salt has been curtailed for this reason. Several common causes of operational failure are mentioned, the net result being that the spraying programme is defective in one way or another; deficiencies in the evaluation of results are also not uncommon. Whereas these technical and operational mistakes are largely the responsibility of the technical and executive authorities of the malaria organization, administrative failures are held to be the responsibility of the governments concerned, and the report gives a list of the chief administrative causes of failure. [Many of the items on this list reflect the predictable reactions of conservatively-minded government departments and officials to the demands

of any specialist that he be given top priority and complete freedom of action for his work.]

The report emphasizes the extreme importance of foreseeing and preventing failures by adequate preparatory planning, which may have to be extended for more than a year. The proposed plan of operations should be given a preliminary field test before being finally adopted. The decision to eradicate malaria should be regarded as a solemn commitment on the part of the highest government authorities, and if assistance is being given by an international organization this might have to be withdrawn unless the plan continued to be fully implemented by the national government.

Evaluation techniques and surveillance are dealt with at some length. Case-detection can be difficult, yet is all-important; early detection and treatment of persons likely to infect mosquitoes is essential to permanent eradication. A combination of active and passive detection of cases must be devised that will cover the whole population. Spraying may reasonably be discontinued and the consolidation phase started when transmission has been completely interrupted over a large and continuous area, the reservoir of residual cases has been lowered below 0·5 per 1,000 population per year, and adequate surveillance—involving both active and passive case-detection—has been established.

The cost of the consolidation phase may amount to 65% or 75% of the cost of the attack phase, and the report recommends an analysis of costs by WHO. It also recommends that the WHO monograph on Malaria Terminology should be brought up to date with a view to including the terms necessary in eradication programmes.

The criteria of eradication are re-stated: "Malaria may be assumed to have been eradicated when adequate surveillance operations have not revealed any evidence of transmission or residual endemicity, despite careful search, during three consecutive years". Proof of the adequacy of the surveillance mechanism is essential. Once these criteria have been met over a large area, the reappearance of minute foci of infection would not necessarily involve reclassification of the whole area as malarious. Inspection, and certification of eradication, by a WHO evaluation team should not normally be requested for areas less than 50,000 km².

In spraying campaigns, 2 gm. of DDT per m.², applied once or twice a year, has been widely used. The possibility of reducing the dose to 1 gm. per m.² was discussed, but this is not advocated except where definite and unequivocal evidence is available about the local efficacy of the lower dosage. Investigations designed to provide this evidence should be assisted by WHO where necessary.

The eradication of malaria in developing countries may not be possible without extensive preliminary work. The pre-eradication programme may involve building up the general administrative and health services to a level at which malaria eradication becomes practicable. If requested by the government, the international personnel may undertake responsibility for this programme at the outset, but the national personnel should take over as soon as possible.

[The reviewer welcomes this apparently new approach. In countries where malaria is but one of many diseases that afflict the population, adequate information of its relative importance is frequently lacking. A survey of

disease in general is essential before governments of these territories can reasonably be asked to give malaria eradication programmes priority over measures against other diseases.]

Other subjects discussed include the place of drugs in malaria eradication, and the possible importance of simian malaria. Despite the recent transmission to man of *Plasmodium cynomolgi bastianelli* from lower monkeys, both accidentally and experimentally, simian malaria was not considered likely to be a major obstacle to the global programme of malaria eradication.

[This report, like its predecessors, needs to be read in full; the material it contains is already so condensed that an abstract cannot do justice to it. The recommendations for the seventh award of the Darling Medal and Prize, mentioned at the end, have since been made public. The award has been made jointly to Sir Gordon COVELL and Dr. Arnoldo GABALDON, both of whom have made notable contributions to our knowledge of malaria and its control.] *T. Wilson*

MSANGI, A. S. **Comparison of BHC and DDT Larvicides against** *Anopheles gambiae*. *East African Med. J.* 1960, Dec., v. 37, No. 12, 776–9. [11 refs.]

Tests were made to compare the efficiency of gamma BHC and DDT solutions in oil against the larvae of *Anopheles gambiae* in East Africa. The standard formulation in field use has been a 5% solution of DDT, but a 0·5% solution of gamma BHC has been introduced into East Africa on the grounds of cheapness and convenience, and the object of the author was to test whether this latter formulation would control *A. gambiae* satisfactorily. The conclusion is that it does not. A series of tests was made in concrete tanks, each containing 100 introduced *A. gambiae* larvae. Dosages between 0·05 and 0·75 ml. of 0·5, 0·75 and 1·0% oil solutions of gamma BHC per sq. yard were applied to the tanks. For comparison 2 tests with 5% DDT at dosages of 0·025 and 0·05 ml. per sq. yard were included in the series. Additional tanks with larvae were left as untreated controls.

The results showed that at the currently used dosage of 0·5 ml. per sq. yard of 0·5% gamma BHC (0·4 oz. per acre) only about 90% of the larvae were dead 24 hours after application. With 0·75 ml. of the 1·0% formulation per sq. yard, a kill of 100% was obtained. On the other hand a dosage of only 0·05 ml. of the 5% DDT solution per sq. yard also gave a 100% kill. This latter dosage is only one-tenth the recommended field dosage.

The author therefore concludes that gamma BHC is inferior to DDT as a larvicide against *A. gambiae*. At the same time he suggests that the currently recommended dosage of DDT (2 quarts of the 5% solution per acre) is unnecessarily high and might well be reduced to one-fifth, *i.e.* to 2 quarts of a 1·0% solution per acre. *W. W. Macdonald*

STEYN, J. J. Verdere dragtigheidsdata van *Anopheles gambiae* Giles in Transvaal. [**Further Observations on Gravidity Studies in** *Anopheles gambiae*] *South African Med. J.* 1961, Feb. 11, v. 35, No. 6, 110–12.

The English summary appended to the paper is as follows: —

"The rationale of our simplified gravidity technique for determining the presence of physiological resistance of *Anopheles gambiae* to BHC is that, if this vector is resistant to BHC, fully-gravid females will still be found indoors.

"During the present investigation resting places were check-sprayed with 'pyagra', and recovered specimens recorded as males, unfed, fed, half-gravid or fully gravid females. Dissections revealed that the ratio of unfed to fed and gravid females was respectively 1:9; 1:9, 1:9; 1:8, and 1:10 in a total of 178 resting places; 130 unsprayed huts, 48 resting places; 30 various resting places, and 18 dongas. These consistent ratios confirmed our former findings. Females lived 3·1 times as long as males. The highest ratio of males to females was 1:2·7, and occurred in huts. It is considered that huts are situated too near the breeding places.

"It is concluded that this technique yields reliable data and should be used in malaria eradication campaigns; as well as after virtual eradication when surveillance units spray huts with BHC only in areas yielding positive human parasite carriers."

[See this *Bulletin*, 1960, v. 57, 1242.]

REID, J. A. **Mosquitoes, Insecticides and Evolution.** Reprinted from *Proc. Centenary & Bicentenary Congress of Biol., Singapore*. Dec. 2–9, 1958. pp. 217–19. 1960. Singapore: Univ. of Malaya Press.

The theme of this brief paper is that a study of the abnormal, in this instance the development of resistance to insecticides, may throw some light upon the normal, the slow evolution of insect species.

In West Africa, the selection pressure of dieldrin on *Anopheles gambiae* has changed the incidence of the resistant gene dramatically within $1\frac{1}{2}$ to 2 years, equivalent to some 25–50 generations [this *Bulletin*, 1956, v. 53, 857]. In this short time, the incidence of the resistant gene has risen from what may have been less than 1 in 1,000 to something approaching 100%. Although the resistant mosquitoes fall a long way short of being species, the mechanism of this change may help explain a natural and somewhat puzzling phenomenon.

The usual form of *A. gambiae* breeds in fresh water and the larvae die in brackish water. Yet salt-water forms of *A. gambiae* have evolved, presumably separately, both on the west [*ibid.*, 1948, v. 45, 482] and the east [*ibid.*, 1951, v. 48, 512] coasts of Africa; the west coast form is usually regarded as a separate species, *A. melas*. It seems likely that this ecological differentiation, amounting in *melas* to speciation, has arisen from exposure to a chemical selecting factor, salinity, in much the same way as resistance to the insecticide arises. Similar fresh water and salt-water pairs are known among the anophelines of Malaya and South East Asia.

The author emphasizes the adaptability of some insect species in the face of sudden environmental change, and suggests that a natural disaster, such as a flood, might well produce permanent changes in the ecology of adaptable species within a few years instead of thousands of years. *T. Wilson*

See also p. 752, WEBBE, **The Susceptibility of Fourth-Stage Larvae of *Anopheles gambiae, Aëdes aegypti* and *Culex pipiens fatigans* to some Phosphoric Acid Esters.**

Corrêa, R. de R., De Lima, A. R. & Guarita, O. F. Informações sôbre o *Anopheles aquasalis* sua suscetibilidade ao DDT. [**Observations on the Susceptibility of *Anopheles aquasalis* to DDT**] *Arquivos de Hig. e Saúde Pública.* São Paulo. 1960, Dec., v. 25, No. 86, 301–4, 1 graph.

The English summary appended to the paper is as follows:—

"Some tests were carried out for measuring the susceptibility of *Anopheles aquasalis* to DDT, in Sítio Adriano, Vicente de Carvalho, 'município' of Guarujá, State of São Paulo, Brazil.

"The CL_{50} obtained varied from 0·56% to 0·98% showing that this species is susceptible to the insecticide."

[See this *Bulletin*, 1961, v. 58, 23.]

Hsieh, Hsien-Chen. **Malaria Parasites of the Taiwan Monkey.** Reprinted from *Formosan Sci.* 1960, Dec. 1, v. 14, No. 5, 477–86. [27 refs.]

Because of the confusion in the identification of the malaria parasites of *Macacus cyclopis*, which is the only species of monkey found in Taiwan, the author has reviewed the published descriptions of these parasites. From these descriptions and from his own observations he identifies the simian malaria parasites in Taiwan as *Plasmodium inui*, *P. knowlesi* var. *arimai*, *P. cynomolgi cyclopis* subsp. nov. (for the species previously named *P. inui* var. *cyclopis*) and *P.* (or *Hepatocystis*) *taiwanensis*.

The vectors of these parasites are unknown and the author has been unable to infect *Anopheles hyrcanus sinensis*, *A. annularis*, *A. ludlowii* [*ludlowae*] and *A. minimus* from *M. cyclopis* infected with *P.* (or *Hepatocystis*) *taiwanensis*.

The possibility of simian malaria being a zoonosis in Taiwan is mentioned but only the failures to transmit *P. knowlesi* var. *arimai* and *P. cynomolgi cyclopis* to human beings are recorded. *J. F. B. Edeson*

Eyles, D. E. **Susceptibility of *Anopheles albimanus* to Primate and Avian Malarias.** *Mosquito News.* 1960, Dec., v. 20, No. 4, 368–71.

"*Anopheles albimanus*, as compared with *A. quadrimaculatus*, was an inefficient experimental vector of *Plasmodium cynomolgi bastianellii*, but transmission was accomplished with this species.

"Neither *A. albimanus* nor *A. quadrimaculatus* appeared to be efficient vectors of *Plasmodium inui*.

"*A. albimanus* showed midgut infections with oöcysts of *P. gallinaceum* in a few instances, but there were fewer oöcysts than in *Aedes aegypti* and they appeared retarded in their development. One attempt at transmission failed.

"*A. freeborni* became infected with *P. gallinaceum* and transmission was accomplished."

[See also this *Bulletin*, 1931, v. 28, 494.]

Schwink, T. M. **The Effect of Anti-Erythrocytic Antibodies upon *Plasmodium berghei* Infections in White Mice.** *Amer. J. Trop. Med. & Hyg.* 1960, May, v. 9, No. 3, 293–6. [14 refs.]

White mice were injected daily for 3 to 8 days with anti-mouse erythrocyte serum (prepared from rabbits), either by the intravenous or by the intraperitoneal route and in quantities scaled according to the weight of the animal. The mice were given immune serum just before infection with *Plasmodium berghei* or 2 days later. Control mice were injected with normal serum and the subsequent parasitaemias were compared. The anti-erythrocyte serum naturally resulted in an anaemia and the appearance of an excess of immature corpuscles in the blood; the latter are favoured by *P. berghei*, so it was not surprising that heavier infections (25% as against 7%) and earlier death (in half the time) ensued in the experimental group of animals. These results are unlike those of similar experiments with species of malaria parasites which show no preference for reticulocytes [this *Bulletin*, 1951, v. 48, 714; 1953, v. 50, 386]; in these, the antiserum has a depressing effect on parasitaemia, and such an action was observed in the early stages of the *P. berghei* infections before this became masked by the reticulocytosis. *P. C. C. Garnham*

SATYA PRAKASH. **Studies on *Plasmodium berghei* Vincke and Lips, 1948. XXVII. Duration of Patent Primary Parasitaemia necessary for the Development of Measurable Acquired Immunity, if any, in the Albino Mice.** *Indian J. Malariology*. 1960, June, v. 14, No. 2, 165–70.

28 mice were cured of infections with *Plasmodium berghei* by the intraperitoneal administration of 1·2 mgm. sulphadiazine per 20 gm. body weight daily for 3 days, and were then challenged with the homologous strain. The primary parasitaemia lasted for 3–19 days before treatment was started. 12 mice were then sacrificed for Sergent's total infectivity test and were found to be radically cured; the remaining 16 responded to the challenge, by 14 becoming positive, and 2 resisting reinfection. Even in the 14, parasitaemia was much lower than in controls, with a lengthening of the pre-patent period and a low mortality rate. Death occurred only in those mice whose primary parasitaemia was terminated on the third day, indicating that no immunity develops up to that time. Re-challenge led to a further heightening of immunity in the survivors, as shown by still lower parasitaemias and the shorter course.

[For an earlier study, see this *Bulletin*, 1961, v. 58, 25.] *P. C. C. Garnham*

SATYA PRAKASH. **Studies on *Plasmodium berghei* Vincke and Lips. 1948. XXVIII. The Duration of Immunity due to a Single Untreated *P. berghei* Infection in Albino Rats.** *Indian J. Malariology*. 1960, Sept., v. 14, No. 3, 283–90. [12 refs.]

During a primary infection of albino rats with *Plasmodium berghei* parasitaemia may be apparent for 10–20 days. Immunity is demonstrable when the primary parasitaemia is cured by drugs after 5 days' patency. In order that the host should resist reinfection with the homologous parasite a period of patency of 11 days without treatment appeared to be required.

In the present study the duration of immunity resulting from an untreated

primary infection was studied after different periods of latency without treatment, also when radical cure was effected by means of sulphadiazine. The techniques employed were those of the author [see above].

It was found that the cured animals after a latent period of 1 to 369 days resisted infection with the same parasite. Another batch of rats 93 to 383 days after inoculation resisted infection in the same way. Comparable data are cited for human infection [this *Bulletin*, 1939, v. 36, 780; 1940, v. 37, 183]. The immunity in the rats was believed to persist as a result of latent infection since spontaneous cure is rare. The persistence of immunity after spontaneous cure is however not ruled out. *J. D. Fulton*

FABIANI, G., ORFILA, Jeanne & BONHOURE, G. Influence de l'acide para-aminobenzoïque sur le paludisme du rat blanc à *Plasmodium vinckei*. [**Influence of Para-Aminobenzoic Acid on *Plasmodium vinckei* Infections of the White Rat**] *C.R. Soc. Biol.* 1960, v. 154, No. 7, 1441–2.

The white rat shows a varying susceptibility to *Plasmodium vinckei* according to age. Since the authors had found sulphonamides effective against the parasites they were therefore led to try the effect of *p*-aminobenzoic acid, an anti-sulphonamide, on the infection. The sodium salt was given subcutaneously in a volume of 0·2 to 0·5 ml. according to age of the rat, at a concentration of 5%. These injections were started on the day of infection and continued twice daily, usually for a period of 3 weeks.

The acid lowered the natural resistance of the rat to infection, but if immunity had arisen after infection the acid was not always able to render a latent infection patent.

Results showed that in 19 out of 20 adult rats treated a higher parasitaemia resulted than in untreated controls. In 8 young rats treated parasitaemia was very severe with a high percentage of deaths. *J. D. Fulton*

WEATHERSBY, A. B. **Further Studies on Exogenous Development of Malaria in the Haemocoels of Mosquitoes.** *Exper. Parasit.* New York. 1960, Oct., v. 10, No. 2, 211–13.

Sporozoites, oöcysts and gametocytes of *Plasmodium fallax* were injected into the haemocoeles of *Aedes albopictus* and *Culex pipiens* mosquitoes. *A. albopictus* is normally susceptible to the parasite; *C. pipiens* is refractory.

The sporozoites and oöcysts were dissected from previously infected *A. albopictus* and injected in 0·85% saline; infected turkey poult blood with a high gametocyte count was injected directly. The object was to determine whether the 3 stages of the parasite, and in particular the gametocytes, were capable of further development in the haemocoele of each mosquito. Successful development was demonstrated either by allowing the test mosquitoes to feed on susceptible turkey poults or by microscopic examination of the salivary glands and subsequent inoculation of the glands into other susceptible birds. Of 2,545 *A. albopictus* mosquitoes injected, 476 survived: the percentages of individuals with infected glands after injection of sporozoites, oöcysts and gametocytes respectively were 12·6, 15·9 and 10·6. Of 2,564 *C.*

pipiens injected, 507 survived: none of the survivors injected with sporozoites, oöcysts or gametocytes had infected glands.

These results support previous work by the author with *A. aegypti*, *C. pipiens* and *P. gallinaceum* [this *Bulletin*, 1953, v. 50, 605; 1955, v. 52, 612], and he concludes that since all exogenous stages of the parasite developed in the haemocoele of susceptible mosquitoes, therefore the factors controlling development in *A. albopictus* and inhibiting development in *C. pipiens* are systemic in nature and not localized in the stomach wall.

[The sites of development of the oöcysts following the injection of gametocytes into *A. albopictus* are not recorded, but in similar experiments with *A. aegypti* and *P. gallinaceum*, reported previously, the author showed that the stomach wall was not a primary site of development.] *W. W. Macdonald*

CORRADETTI, A. & ILARDI, Antonietta. **A Strain of *Plasmodium elongatum* from *Corvus cornix*.** *Parassitologia*. Rome. 1960, Dec., v. 2, No. 3, 367–70.

"*Corvus cornix* was found naturally infected with *Plasmodium elongatum*. The strain derived from *Corvus cornix* was transmitted by blood inoculation to other birds of the same species, where it produced a typical *P. elongatum* infection and caused no death. The same strain was successfully transmitted to the canary, and from canary to canary for 13 subsequent passages. It was relatively mild in the first few passages, but became progressively more virulent in the subsequent ones."

MOHAN, B. N. **Further Observations on Sporogony Cycle of *Plasmodium relictum* in a DDT-Resistant Strain of *Culex fatigans*.** *Indian J. Malariology*. 1960, June, v. 14, No. 2, 179–85.

The author confirms his earlier observations [this *Bulletin*, 1956, v. 53, 842] that malaria parasites develop normally in strains of mosquitoes resistant to insecticides, and here shows that even completely resistant insects can support the sporogony of the parasites. He compared the development of *Plasmodium relictum* in 372 normal and 279 DDT-resistant *Culex fatigans*, the experimental group being kept in continuous contact with the insecticide. The sporozoite index often reached 100% in both groups and the sporozoites appeared to be normal in the resistant insects, while even exposure of the mosquito to heavy deposits of DDT for 48 hours after the infective feeds had no effect on the parasite's development, which was completed in 8 days. [It would have been useful if the author had given additional data on (1) the number of oöcysts, and (2) subsequent infections in clean birds, to support his argument that DDT is completely without effect on the parasite.]

P. C. C. Garnham

TRYPANOSOMIASIS

In this section abstracts are arranged as far as possible in the following order:—African—*human, animal;* American—*Chagas's disease and other trypanosome infections. In each form the following order is followed:— epidemiology, aetiology, transmission, pathology, diagnosis, clinical findings, treatment, control.*

EAST AFRICA HIGH COMMISSION. **East African Trypanosomiasis Research Organization, Tororo. Report No. 10, 1959** [LUMSDEN, W. H. R., Director]. 64 pp., 8 figs. 1960. Nairobi: Govt. Printer. [Sh. 5.]

Few of the results given in this detailed and lengthy report can be summarized in the space available, but the scope of the content will be indicated.

Protozoology

The available strains of deep frozen trypanosomes, collected from both man and animals, are listed. The survival of *Trypanosoma congolense* in four physiological solutions, maintained at three different temperatures, has been investigated, as has the production and storage of suitable antigens for serological tests. An improved technique for the collection of sera from animals has been devised.

Biochemistry

The discrepancies between some different methods for the estimation of cerebrospinal fluid protein have been investigated; differences in protein ratios have been examined as a possible cause of such discrepancies. The metabolism of nitrofurazone has been studied in both man and the rat, and also the effects of the drugs on pyruvate metabolism in man.

Chemotherapy

Initial results are given of investigations into the toxic effects of nitrofurazone when used for the treatment of *T. rhodesiense* sleeping sickness; methods have been applied to distinguish patients liable to haemolytic attacks. The occurrence of agranulocytosis in Mel B therapy has been investigated.

Epidemiology

A brief study of the fauna in the Lugala focus of Rhodesian sleeping sickness in Uganda suggested that bushbuck is the commonest antelope and that waterbuck also frequent the vicinity of human habitations, unlike buffalo and elephant which only appear when the maize is ripe. Observations made in Lugala village, on the relative frequency of *Glossina pallidipes* and *G. palpalis* biting man, indicated that the latter species was usually the greatest offender; at least one of 21 strains of *brucei* group trypanosomes, isolated from 14,500 *G. palpalis,* was *T. rhodesiense.*

Entomology

An ingenious apparatus has been designed to feed large numbers of flies individually on single mice. Another piece of apparatus is described for the

feeding of flies through a membrane on fresh defibrinated ox blood; the survival rate and puparial production of such flies compared very favourably with the figures for flies fed on live sheep. [Had the source of blood been the same, the comparison would have been more valid.] The variability of catches from traditional and from transect fly rounds has been compared statistically, and the frequency of sampling defined for certain degrees of reliability of population estimate. Observations on the siting of traps, and on the lack of correlation between trap and fly-round catches are described. Physiological studies have been made on seasonal changes in the fat content and on the post-teneral development of the thoracic musculature of *G. swynnertoni*. Comparisons have been made between the fat content, residual blood meal and female percentage of *G. swynnertoni* coming to a catching party, a stationary bait animal, a vehicle or when found at rest on the vegetation. The dispersal and flight range of *G. morsitans* have been studied.

[For 1958 Report, see this *Bulletin*, 1960, v. 57, 561.] *T. A. M. Nash*

THOMSON, W. E. F. **Historical Fragments on Trypanosomiasis and the Spread of Sleeping-Sickness to British East Africa.** *East African Med. J.* 1960, Nov., v. 37, No. 11, 724–30. [27 refs.]

The author is a member of the Department of Veterinary Services of Kenya; he has collected an interesting series of historical notes on sleeping sickness in East Africa, but he begins this short paper with a few early records from other parts, mostly well known. The paper is correctly entitled "fragments"; it is not a comprehensive detailed account. For East Africa the known story really begins with the huge epidemic which swept the lake-shore areas of Uganda at the turn of the present century, and which might have been introduced by Stanley's expedition in 1888.

No effective treatment existed at that time, and the mode of transmission had not yet been found, but the natural instinct of the Government was to move the people away from the affected localities, and in the circumstances this was wise and probably effective, but it naturally met with much opposition from the Africans who attributed the disease to the eating of fish, of which large numbers were found dead in Lake Victoria, or of hippopotamus which also had died in large numbers, or to evil influences originated by a District Commissioner.

The author gives a useful list of references. *Charles Wilcocks*

DIAS, J. A. T. S. & DE SOUSA JÚNIOR, J. Diferenciação das espécies Moçambicanas do subgénero *Glossina* Wiedmann, 1830, com base no método de Jackson. [**Differentiation of Species of *Glossina* in Mozambique by Jackson's Method**] *Anais Inst. Med. Trop.* Lisbon. 1959, Jan.–Dec., v. 16, Nos. 1/4, 223–7, 4 figs. on 4 pls. English summary (8 lines).

The authors have tried JACKSON's method [this *Bulletin*, 1953, v. 50, 394] for distinguishing species of tsetse of the *Glossina morsitans* group. This depends on the shape of an indentation on the distal edge of the hypopygium basal plate of the male genitalia. Jackson's paper contains photographs of

G. morsitans, *G. m. submorsitans*, *G. swynnertoni*, *G. pallidipes*, *G. longipalpis* and *G. austeni* (as well as some *G. morsitans-swynnertoni* hybrids).

The present paper shows photographs of *G. morsitans orientalis*, *G. pallidipes*, *G. austeni* and *G. a. mossurizensis*. In general, the authors agree that the forms of corresponding species are as described by Jackson, but they consider the method is not adequate to distinguish subspecies. Also it is rather troublesome to make adequate preparations; therefore it seems more appropriate for confirmatory diagnosis. *J. R. Busvine*

GLASGOW, J. P. & BURSELL, E. **Seasonal Variations in the Fat Content and Size of *Glossina swynnertoni* Austen.** *Bull. Entom. Res.* 1961, Jan., v. 51, Pt. 4, 705–13, 3 figs. [16 refs.]

A natural population of *G. swynnertoni* at Shinyanga, Tanganyika, has been studied in regard to size and fat content of non-teneral males by monthly samples for 13 years. Size was assessed by measurements of a wing vein; fat content by weighing, extraction and reweighing of starved flies. Corrections were made for effects of fly size and residual blood meal on the fat content.

Flies were large from February to July and small from August to January. This suggests an effect of the wet season (December to May) and dry season (June to November) on the parent females, allowing a 2-month lag for pupal development. Certainly, the male flies have more fat in the rains and less in the dry season, and probably the same thing is true of females, reflecting a nutritional stress in the dry season.

The correlation of small size and saturation deficiency reported by JACKSON [this *Bulletin*, 1953, v. 50, 487] is confirmed; but more mature considerations suggest that this is not a simple cause and effect. The small size of the tsetses no doubt results from a variety of nutritional stresses affecting the female parents during the dry season (*e.g.* depleted shade, bush fires, secondary effects on mammals, etc.). *J. R. Busvine*

LEGGATE, B. M. & PILSON, R. D. **The Diurnal Feeding Activity of *Glossina pallidipes* Aust. in relation to Trypanosome Challenge.** *Bull. Entom. Res.* 1961, Jan., v. 51, Pt. 4, 697–704, 1 fig. [17 refs.]

This paper marks an advance towards the solution of the problem of how best to measure trypanosome challenge, which has been defined as the number of infected tsetse bites which a given host receives in unit time. The authors point out that the product of the apparent fly density and the infection rate provides a false index of challenge, and stress that for this purpose density should be based on the number of flies which *feed* on the given host, and not on the number caught on a fly-round which includes many individuals that are not hungry. The importance of taking into account the pattern of the tsetse's diurnal feeding activity on the given host is also emphasized.

The results of an experiment are given which enforce their argument and suggest a new approach to the problem. On 15 occasions, over a period of 40 days in the late dry season, an ox was tethered under a tree from before dawn

until after dusk; only *Glossina pallidipes* which gorged on the ox were recorded. The mean number of non-teneral flies which fed on the ox was 289 per day and the infection rate among 613 non-teneral flies captured in the vicinity was 9·8%; it was estimated that the ox received an average of 28·32 infected bites per day. The trypanosome challenge, calculated as the mean number of infected flies that fed per hour, averaged 2·02 for the whole day, but owing to the pronounced pattern of the diurnal feeding activity, this figure varied from 1·63 for the early morning to 0·85 for the middle part of the day and 3·64 for the later part. The authors discuss certain sources of error, in particular inaccuracies associated with the evening period of peak activity, but conclude that the information thus obtained is more valid in the estimation of challenge than is the information obtained by the use of traps or apparent density as calculated from any type of fly-round.

[Their static method should provide a good index for the place where the ox is tethered, but owing to the appreciable variations in fly density to be expected in the grazing area needed for a drug trial, adequate sampling could only be achieved by a multiplication of such experiments or by some system of leading an ox along paths which were representative samples of the area.]

T. A. M. Nash

NODENOT, L., RIDET, J., CHARTOL, A. & DESMOULINS, G. Un médicament nouveau contre la maladie du sommeil le Mel W. [**Mel W, a New Drug for the Treatment of Trypanosomiasis**] *Méd. Trop.* Marseilles. 1960, Nov.–Dec., v. 20, No. 6, 679–98, 6 figs.

Mel W [this *Bulletin*, 1959, v. 56, 1115] was used by the authors for the treatment of 9 patients suffering from trypanosomiasis [presumably *Trypanosoma gambiense*] at various stages of the infection. 2 of them were at the lymphatico-sanguineous stage, 3 at the period of suspected early central nervous system invasion, 2 with clear central nervous system involvement, one at the sleeping sickness stage, and the last at a stage corresponding to the penultimate of these but with an infection resistant to tryparsamide, pentamidine and moranyl. The first 8 of these patients had had no previous specific drug treatment.

Mel W was given intramuscularly in the form of a freshly prepared 5% solution; at first the maximum single dose was restricted to 200 mgm.; later this was increased to 250 mgm. The course of treatment followed that advocated for Mel B; daily doses were given for 3 days at a level of 3·6 mgm./kgm. body weight for each dose; this in some cases was repeated after a couple of weeks; in the later cases the level of daily dosage was increased to 4 mgm./kgm. and the period prolonged to 4 days, again repeated after one or two weeks. The last patient, who had a drug-resistant infection following repeated antecedent treatment, was given 3 series of 4-day courses of Mel W at weekly intervals each daily dose being at a level of 3·6 mgm./kgm. body weight; the total dosage in this series was 2·4 gm. of the drug. A month or so later a further couple of 4-day treatments with Mel W injections were given to this last patient at a daily level of 2·5 mgm./kgm.; as the cerebrospinal fluid thereafter had improved but was still grossly abnormal yet further courses of treatment with other drugs were given to him.

Details of the findings, treatments; and progress of each of these 9 patients are given in some detail. Studies on the blood levels achieved, and on the urinary elimination of Mel W and of arsenic, were undertaken in 7 of these patients. In the first 8 patients trypanosomes where present vanished from the blood and glands within a few hours of the first Mel W injection. Though Mel W obviously passed the blood-brain barrier, as judged by the response of the patients, it is clear that bigger doses of Mel W will have to be given to equal the dramatic results obtained by treatment with Mel B or 3854 RP. Nevertheless, the therapeutic response to Mel W treatment at least equals that to treatment with the older drugs; it has the advantage of much less toxicity and therefore is more suitable for mass treatment. *A. R. D. Adams*

FIERLAFYN, E. Le traitement de la trypanosomiase africaine par la Furacine. [**Treatment of African Trypanosomiasis with Furacin**] *Ann. Soc. Belge de Méd. Trop.* 1960, June 30, v. 40, No. 3, 469–80.

Relapse of African trypanosomiasis after treatment with the accepted drugs (tryparsamide, Mel B, suramin and pentamidine) is frequent and the prognosis in this event is grave. Furacin (the nitrofurazone of nitro-2-furaldehyde-semicarbazone) has been shown to cure both *Trypanosoma gambiense* and *T. rhodesiense* infections in mice; its value in human trypanosomiasis, when given alone and more especially with other trypanocidal drugs, has also been established [this *Bulletin*, 1956, v. 53, 31; 1957, v. 54, 136; 1958, v. 55, 135 and 136].

The author has used Furacin in the treatment of Congolese patients with trypanosomiasis since 1958; this paper is a report on Furacin treatment of 82 such patients. In all these 82 patients the cerebrospinal fluid [CSF] was abnormal, either in cell content or by virtue of the presence of parasites (found in 12 of the patients). There were 18 newly diagnosed cases among these 82 patients; the other 64 were suffering relapses after previous treatment, 60 of them with tryparsamide with or without some of the other currently used trypanocidal drugs. All these 64 patients therefore had proved refractory to the conventional drug treatments, and their prognosis was bad.

Furacin alone was used in the treatment of the author's 82 patients. The dosage given to adults was 1,500 mgm. (3 tablets) by mouth daily for 10 days; lumbar puncture was then repeated and if the CSF did not show material return towards normality a second 10-day course of Furacin treatment was given. As a result 21 patients had 2 courses of Furacin treatment, but whether this was really necessary is now open to doubt as it has been found that after one course of treatment there was a progressive improvement in the CSF extending over some weeks after treatment. The dosage of Furacin used for children was 30 mgm./kgm. body weight daily.

The side effects of Furacin treatment were an urticarial reaction and a fall in the red cell count together with a loss of weight (4 to 5 kgm.) in most of the patients, vomiting (33 patients), joint pains (4 patients), polyneuritis (11 patients), and neuro-psychiatric reactions (6 patients). In 2 others hepatitis developed which probably was coincidental and due to a virus infection. One patient developed diabetes 12 days after treatment; its possible relationship to

the drug causes the author some concern. The polyneuritis was the complication most to be feared, but none of the complications was grave or permanent. The polyneuritis could be lessened by vitamin B1 supplementation.

The immediate result of the treatment on the symptoms as a whole was good; on some subjective neuro-psychiatric symptoms its effect was spectacular and 3 comatose patients recovered mentally by the fifth day of treatment. Objective neurological abnormalities, such as damage to the pyramidal tracts, cannot similarly benefit. The action on the CSF was to cause the trypanosomes and the Mott cells to disappear and markedly to reduce the cell count in the great majority of patients, sometimes to normality by the end of treatment and usually to a low figure within a few months. There were 3 deaths in this series of 82 patients. On the evidence presented the author regards nitrofurazone as a most important addition to the list of trypanocidal drugs; it is one which will save patients whose trypanosomal infections have become refractory to the existing drugs. Moreover it is easily given and is relatively innocuous to the patient, being unattended by the graver complications attending the use of some of those drugs. *A. R. D. Adams*

La Croix, E. A. S. **A Trial Use of Grass-Mat Passages in protecting Humans from Attacks by Tsetse Flies.** *Bull. Entom. Res.* 1961, Jan., v. 51, Pt. 4, 639–42.

An outbreak of sleeping sickness occurred in northern Ghana in March 1957. Medical relief began immediately and tsetse control measures involving protective clearing were planned, but it was not possible to initiate the latter for some months. Accordingly, there was a need for a temporary measure giving the villagers protection from tsetse bites, which had to be cheap and speedy. The available biological information about the two prevalent species of *Glossina* (*palpalis* and *tachinoides*) suggested that they find their hosts by sight. Accordingly it was planned to build screens of grass matting to form passages to the water holes used by the villagers. The mats were woven locally in pieces about 12ft. × 4ft. 6in., and were fixed to stakes in 2 layers to form walls about 8 feet high. The passages were designed to enclose the path to the stream from about 75 yards and to be about 10 feet across, widening to 20 feet by the water-side and enclosing a large water surface by a loop into the stream. Over the stream the mats left a gap of about 1 foot above the water surface.

These passages were accepted and used by the villagers. Assessments of tsetse were made, over 3 months, by traps and fly-boy catches, both inside and outside the passages. The results showed a very substantial protection from tsetse attack. The cost was about £16 per passage, which was negligible in comparison with the general costs: *e.g.* 1-mile-long protective clearing cost £177. *J. R. Busvine*

Lincicome, D. R. **Serial Passage of *Trypanosoma lewisi* in the Heterologous Mouse Host. II. Developmental History during Transfer in Adequately-Fed Hosts.** *Ann. Parasit. Humaine et Comparée.* 1960, July–Sept., v. 35, No. 4, 457–68, 2 figs.

PAUTRIZEL, R., RIPERT, C. & DURET, J. Résistance du foetus de rongeur (rat, cobaye, lapin) vis à vis de *Trypanosoma equiperdum*. [**Resistance of Rodent Foetuses (Rat, Guineapig, Rabbit) to** *Trypanosoma equiperdum* **Infection**] *Ann. Parasit. Humaine et Comparée*. 1960, July–Sept., v. 35, No. 4, 469–87, 4 figs. & 1 chart. [44 refs.]

HERRER, A. Distribución geográfica de la enfermedad de Chagas y de sus vectores en el Perú. [**Geographical Distribution of Chagas's Disease and its Vectors in Peru**] *Bol. Oficina Sanitaria Panamericana*. 1960, Dec., v. 49, No. 6, 572–81, 1 map. [26 refs.] English summary.

The first case of Chagas's disease was recorded in Peru in 1919 in a patient from the forest area bordering on Brazil [this *Bulletin*, 1920, v. 15, 384] and the second in 1943. Since then and especially since investigations were intensified more cases were recognized and in 1958 there were about 200. The disease is endemic principally in 2 topographically different regions. One is in the south-west slopes of the Andes where the altitude reaches some 2,500 metres: the vector is *Triatoma infestans*. The second region is in the high jungle area of the Amazon basin, where cases have been found at altitudes up to 1,500 metres: here *Panstrongylus herreri* is the main vector. There are no triatomids in the mountain area above 3,500 metres. 10 other species of triatomids which are listed, have been found. They are, however, relatively few in number and as they are not house-haunting they have little contact with man and domestic animals, though *P. chinai* and *Rhodnius pallescens* have been found naturally infected with *Trypanosoma cruzi*. It is believed that *T. infestans* is a recent importation into Peru, but it is spreading actively.

The dissemination of the triatomids and their possible reservoir hosts is discussed in relation to climate and geography. There is a high rate of infection of *T. infestans* in areas where guineapigs are numerous and this animal seems to be the principal reservoir of Chagas's disease in Peru; dogs and cats are of less importance in transmission in the *T. infestans* area. The reservoirs in the area where *P. herreri* is the vector are not known, but it has been observed that with increasing altitude of endemic areas, the relationship between *P. herreri* and domestic animals increases and this occurs notably in the case of guineapigs. [See also this *Bulletin*, 1956, v. 53, 1104; 1957, v. 54, 271.] *H. J. O'D. Burke-Gaffney*

ZELEDÓN, R., PÉREZ, C. L. & BERRÍOS, A. Hallazgo de *Schizotrypanum cruzi* en un puerco espín (*Coendou mexicanum laenatum*) de Costa Rica. [*Trypanosoma cruzi* **in a Porcupine in Costa Rica**] *Rev. Biologia Trop.* San José, Costa Rica. 1960, Dec., v. 8, No. 2, 201–2.

PIFANO C., F. Evaluación de los procedimientos de laboratorio empleados en el diagnóstico de la enfermedad de Chagas. [**Evaluation of Laboratory Methods Used in the Diagnosis of Chagas's Disease**] *Bol. Oficina Sanitaria Panamericana*. 1960, Dec., v. 49, No. 6, 563–71. [20 refs.] English summary.

This paper, by a distinguished authority, was presented at a conference on Chagas's disease in Washington, DC in March 1960. In it Professor Pifano

discusses fully the various stages of the infection and the significance of and indications for various laboratory methods in diagnosis. The relative value of each type of test is assessed in relation to the stage of the disease and examples are given of epidemiological studies and experiments in laboratory animals. The procedures discussed are examination of fresh and stained blood smears, xenodiagnosis, animal inoculation, blood culture, agglutination, precipitin and complement-fixation tests and an adaptation of Sabin and Feldman dye test as used in toxoplasmosis, in which culture forms of *Trypanosoma cruzi* are used. The author has begun studies with the last named test, but results are not yet available.

As a result of his experiences for more than 20 years the author has reached certain conclusions. He considers that in the acute stages of the disease, examination of a thick film of fresh blood is the best method. When the disease is diagnosed on other grounds but the blood film is negative xenodiagnosis should be undertaken. Examples are given which show that this test tends to become increasingly negative as the disease becomes chronic. In 20,485 xenodiagnoses made between 1936 and 1958 (in which 250,000 specimens of laboratory strains of *Rhodnius prolixus* were used), 1,600 cases (7·8%) of chronic Chagas's disease were detected. The author points out that with a single xenodiagnostic test 40% of chronic cases were negative, but when this was repeated and the number of blood meals by the insects was increased, the negative results fell to 20%–30%. The reasons for this are discussed.

Precipitin tests with a polysaccharide fraction of *T. cruzi* as antigen were positive in 34 of 36 acute cases but in only 5 of 52 chronic cases. Guineapigs and puppies were found suitable for inoculation, but when blood from 40 persons with the chronic disease was inoculated into these animals only 5 puppies were positive, so that this procedure is not recommended for routine purposes. This also applies to blood culture in chronic cases; of 100 such, confirmed by xenodiagnosis, only 16 were positive. The 2 tests were done simultaneously in 35 cases; xenodiagnosis was positive in 32 and blood culture in only 5. The author adds that in *T. rangeli* infections, on the other hand, blood culture gives results equal or superior to those obtained by xenodiagnosis. Agglutination tests were unreliable.

Finally, it is stated that complement-fixation tests with *T. cruzi* antigens are of great value provided that reagents and techniques are satisfactory. In the author's hands this test was positive in 40% of acute and 90% of chronic cases of Chagas's disease. *H. J. O'D. Burke-Gaffney*

Corrêa, M. O. A., De Britto e Silva, M. & Amato Neto, V. Emprêgo de ondas ultra-sônicas no preparo do antígeno para diagnóstico da moléstia de Chagas mediante fixação do complemento. Nota prévia. [**Ultrasonic Waves in the Preparation of an Antigen for the Diagnosis of Chagas's Disease**] *Rev. Inst. Adolfo Lutz*. São Paulo. 1959, v. 19, 5–8.

The English summary appended to the paper is as follows:—

"A new technic in the preparation of an antigen for the diagnosis of Chagas' disease by the complement fixation test (Machado-Guerreiro test) is presented. A suspension of trypanosomes in saline solution with 1/10,000 merthiolate was treated by ultrasonic waves in two 10-minute periods, using a

frequency of 800 kilocycles in the first period and 2,400 kilocycles in the second one, with energy consumption of 30 and 38 watts, respectively. Preliminary results obtained in 87 sera suggest that the preparation of antigens by this technic is simple, they are more stable and easily stored."

FIFE, E. H., Jr. & KENT, J. F. **Protein and Carbohydrate Complement Fixing Antigens of** *Trypanosoma cruzi*. *Amer. J. Trop. Med. & Hyg.* 1960, Sept., v. 9, No. 5, 512–17. [20 refs.]

The original Machado reaction in patients suffering from Chagas's disease was greatly improved by PELLEGRINO and BRENER [see this *Bulletin*, 1952, v. 49, 1034] by substituting purified antigens for the crude crithidia of cultures. The present authors have gone a step further in analysing the exact components which give the most specific reactions in the complement-fixation test. Cultural forms of a Brazilian strain of *Trypanosoma cruzi* were desiccated and subjected to ether in the cold and veronal buffer; the lipid-free extract was fractionated with chloroform-gel to produce separate protein and carbohydrate antigens. Tests were then carried out with these antigens and unfractionated portions, a comparison being made between sera from cases of Chagas's disease from different parts of South America, and sera from cases of mucocutaneous and cutaneous leishmaniasis [but not apparently visceral, although the organism is called in one place in the text *L. donovani*], schistosomiasis, filariasis, trichinosis, ankylostomiasis, syphilis and healthy controls.

The antigen worked best at a dilution of 1 in 64 for the unfractionated and protein samples and 1 in 8 for the carbohydrate. The unfractionated antigen gave the highest proportion of strongly positive reactions (38 in 40), but the test was not specific in that sera from patients with other infections also reacted in the same way (22 among 49 syphilitics). The protein and carbohydrate antigens were much more specific, but sometimes in a lower titre; cross-reactions only occurred in *L. brasiliensis* and *tropica* infections. The protein fraction was the more suitable, because it worked in higher dilutions, and cross-reacted with only one species of *Leishmania*.

P. C. C. Garnham

RUBIO, Mafalda, GALECIO, R. & HOWARD, J. Dos casos de enfermedad de Chagas congénita. **[Two Cases of Congenital Chagas's Disease]**. *Bol. Chileno de Parasit.* 1961, Jan.–Mar., v. 16, No. 1, 15–18, 2 figs. English summary.

See this *Bulletin*, 1958, v. 55, 140.

PRATA, A. Relação etiológica entre doença de Chagas e megaesôfago. **[Aetiological Relationship between Chagas's Disease and Megaoesophagus]** *Rev. Brasileira Med.* Rio de Janiero. 1960, Apr., v. 17, No. 4, 300–308. [70 refs.] English summary.

The author first points out that so far as is known it is only in Brazil that megaoesophagus (MGO) is endemic, most of the states being affected; that it

presents features which are peculiar to it such as greater incidence in males, changes in the ECG, positive Machado-Guerreiro test; that other mega conditions like megacolon, megarectum, etc. are often combined with it; and that it is endemic in areas where Chagas's disease is endemic, though the reverse is not true as in certain of the Brazilian states and also in some of the other South American countries where Chagas's disease is endemic, MGO does not occur though other megas (of the large intestine) have been found.

Points in favour of Chagas's disease being the cause of MGO are given. (i) In 20 patients with a chronic heart condition due to Chagas's disease, 1 had MGO, and 5 had difficulty in transit in the lower portion of the oesophagus at X-ray examination. (ii) In 97 patients with MGO, though 62 showed no cardiac symptoms, 27 had dyspnoea on exertion, and 7 cardiac insufficiency. (iii) In 49 patients with MGO, X-ray examination of the heart showed an increased cardiac area in 9. (iv) In 64 patients with MGO, the ECG showed complete A-V block in 3, bundle branch block in 15 (right 13, left 2), disturbed ventricular repolarization in 9, ventricular extrasystoles in 8. In 68 patients the Machado-Guerreiro test was positive in 80%. (v) In post mortems on 6 patients with MGO, 4 showed typical Chagas's myocarditis.

The author thinks that all these facts taken together, including the high percentage of patients positive to the M-G test, constitute an almost complete argument in favour of the *Trypanosoma cruzi* aetiology of MGO, and that the majority of patients with this condition have also a cardiac condition due to Chagas's disease, the two morbid conditions thus existing in the same person.

It is not known, however, how *T. cruzi* produces its pathogenic effects on the oesophagus or why it affects this organ only in certain areas, and further, why MGO is rare in certain areas where Chagas's myocarditis is common. The author states however that none of these facts invalidates the proposition that megaoesophagus is caused by *T. cruzi*.

[This is the most definite statement that the reviewer has read so far on this vexed question. See also KÖBERLE, this *Bulletin*, 1960, v. 57, 569, 571, 572.]

W. K. Dunscombe

MAGARINOS TORRES, C. Miocitólise e fibrose do miocárdio na doença de Chagas. [**Myocytolysis and Fibrosis of the Myocardium in Chagas's Disease**] *Mem. Inst. Oswaldo Cruz*. 1960, Nov., v. 58, No. 2, 161–82, 23 figs. [23 refs.] English summary.

CODA, D., FALCI, N. & MENDES, F. A. T. Contribuição para o estudo e a profilaxia da moléstia de Chagas no Estado de São Paulo. [**The Study and Prophylaxis of Chagas's Disease in Sao Paulo**] *Rev. Inst. Adolfo Lutz*. São Paulo. 1958, v. 18, 83–121. [Numerous refs.] English summary.

An investigation into the incidence and prevention of Chagas's disease was carried out in São Paulo state, Brazil, from 1950 to 1957. 3 genera and 10 species of triatomids (*Panstrongylus*, 3 spp., *Rhodnius*, 2 spp., *Triatoma*, 5 spp.) are known to occur in the state and investigations in 390 of the 435 local government areas into which the state is divided showed that triatomids were

present in 327 (83·8%). Examination of the specimens caught showed that infection by *Trypanosoma cruzi* was detectable in 225 (68·8%) of the areas. In 14 areas the bugs caught were not examined for parasites, though in 5 they seemed to be of epidemiological importance. *T. infestans*, which formed 92·5% of the species caught, was the most important vector, with an infectivity index of 9·4%, *T. sordida* 1·5%, and *P. megistus* one of 0·8%. In all, 276,225 bugs were caught and 14,706 found positive. In addition 56,259 sera from persons in 265 areas were examined by the Machado-Guerreiro test and 11·8% found positive.

Since treatment is ineffective, attempts are being made to eradicate the vectors by means of BHC at the rate of 0·5 gm./m.² of the area to be treated, though it is realized that at one treatment per year this is far from ideal. Since the first, second and third stage nymphs are less resistant than the fourth and fifth nymphal and the adult stages, though even first stage nymphs can transmit the disease, it is suggested that BHC should be used at the rate of 1 gm./m.² 3 times a year; the alternative use of dieldrin may reduce the number of applications. Careful selection of the areas to be disinfected is necessary and also continuous education is essential. Proper construction of houses is required while disinfection of the baggage of all immigrant workers into the state should be compulsory. Eradication should extend peripherally and great care should be taken to ensure that the cleared area does not become infected again. The following species were not found infected: *R. neglectus, R. domesticus, T. tibiamaculata, P. geniculatus* and *P. diasi*, but the authors do not mention any animal reservoirs.

[However Osimani, Torrico, and Rodriguez in other parts of Latin America (this *Bulletin*, 1961, v. 58, 35) have found sylvatic triatomids to be of considerable importance and have also found a marsupial living a semi-domestic life to be an important reservoir.] *W. K. Dunscombe*

LEISHMANIASIS

In this section abstracts are arranged as far as possible in the following order:—visceral, cutaneous, mucocutaneous.

Adler, S. & Theodor, O. **Transmission of Disease Agents by Phlebotomine Sand Flies.** *Annual Rev. Entom.* 1957, v. 2, 203–26, 1 fig. [104 refs.]

The bionomics of sandflies are briefly discussed in so far as they are relevant to epidemiology. Phlebotominae are widely distributed, mainly in the tropics and subtropics, and occur as far north as Paris, Manchuria and Washington, D.C. About 150 species have been recorded from the Old World and about 200 from the New World. The bionomics of many species are still unknown and can only be satisfactorily studied by field observations over a whole season and by laboratory breeding experiments. A quantitative study of the accessory glands of captured females, carried out throughout a season, should provide valuable information on population dynamics. Ecological studies have shown that some sandflies, including important vectors of *Leishmania*, live near

human habitations and also in uninhabited areas where certain rodents occur which are natural reservoirs of *Leishmania*. When sandflies are eliminated from inhabited localities the problem of transmission under feral conditions will remain, and further information should be obtained on breeding places, animal associations and seasonal distribution.

The principles to be considered when dealing with problems of *Leishmania* transmission are laid down, and experiments on the transmission of *L. tropica* reviewed. The prevalence of South American mucocutaneous leishmaniasis in man and dog under various climatic and topographical conditions, the numerous clinical forms it assumes, and the large number of sandflies recorded suggest that a number of vectors are involved. Much work has been done on several species but more knowledge is required of the behaviour of the flagellates in the sandflies and more experimental evidence on transmission. The three epidemiological types of visceral leishmaniasis are considered because the epidemiology is determined by the bionomics of the vector and the role of the animal reservoir. Work on transmission of Indian kala azar by *Phlebotomus argentipes,* transmission of visceral leishmaniasis and animal reservoirs in China, the Mediterranean area and South America are reviewed. The mechanism of transmission of *Leishmania,* vector specificity, and the transmission of lizard haemoflagellates are discussed. Vector specificity is manifested by host preference and a high infection rate following the ingestion of relatively few parasites, and is associated with a definite pattern of behaviour in the flagellates. There are differences among geographical strains of *Leishmania* in their infectivity for the same species of sandfly.

The paper concludes with sections on Carrion's disease, phlebotomus fever and reaction to sandfly bites.

The authors have made many contributions to the study of disease transmission by sandflies, and this review contains much to interest students on the subject. *D. J. Lewis*

Lupaşcu, G., Dănescu, P., Costin, P. & Stefănescu, J. Contribuţii la studiul speciilor de flebotomi din R.P.R. Nota II. Prezenţa în ţara noastră a speciilor *Phlebotomus major* si *Phlebotomus chinensis* var. *simici.* [**Species of *Phlebotomus* in the Rumanian Republic. II. Presence of *P. major* and *P. chinensis* var. *simici***] *Studii si Cercetări Inframicrobiol., Microbiol. si Parazitol.* 1958, v. 9, No. 4, 515–29, 9 figs. on 5 pls. [32 refs.] French summary.

From July to October 1957, the authors recovered a number of *Phlebotomus* species on the banks of the Danube in the centre of the Timisoara region. These were *P. major, P. chinensis* var. *simici, P. chinensis* var. *longiductus* and *P. papatasi.* The first 2 species are recorded for the first time in Rumania. Study of the natural habitats and of human dwellings were made in 2 zones: Zone I was in an uninhabited narrow pass and Zone II, which was situated ahead of the entry of the Danube into the pass, was inhabited.

In Zone I, *P. major* and *P. chinensis* var. *simici* were captured at night in cracks in rocks: 90% and 75% respectively were males. In Zone II, *P. major* (93·75% males) were caught at night in natural habitats (nests of *Merops*) on the sandy banks of the river and one male *P. chinensis longiductus* was also

found. *P. papatasi* (80·42% females) were caught in daylight in dwelling houses.

Further studies would be required to assess the relative prominence of species in natural habitats but the present survey suggests that in the Danube valley all species found, except *P. papatasi,* are wild, and are found in natural habitats both in the neighbourhood of human dwellings as well as in uninhabited areas.

The presence of *P. major* and *P. chinensis,* in addition to *P. perfiliewi* recorded in 1955 [this *Bulletin*, 1957, v. 54, 1398] suggests that several species may play a part in maintaining infantile leishmaniasis in Rumania.

The taxonomy is discussed and illustrated and the findings are tabulated.

H. J. O'D. Burke-Gaffney

Sen Gupta, P. C. & Chatterji, A. **Lymphadenopathy in a Case of Indian Kala-Azar.** *J. Indian Med. Ass.* 1961, Jan. 1, v. 36, No. 1, 21–2, 2 figs. on pl.

"Mild but widespread lymphadenopathy was found in an Indian child, a permanent resident of Calcutta, suffering from kala-azar. *Leishmania donovani* could be demonstrated in the lymph gland puncture smear and there was evidence of leishmanial infection of the gland on histological examination. Though the parasite has been demonstrated in the lymph glands in African, Mediterranean and Chinese forms of the disease, it is probably the first time that it has been found in lymph gland puncture smear in Indian kala-azar."

Linder, J. **Behaviour of Various Trypanosomidae in Larvae of the Bee-Moth,** *Galleria mellonella. Bull. Res. Counc. of Israel.* 1960, Nov., v. 8E, No. 4, 128–34, 7 figs.

"Fourth stage larvae of *Galleria mellonella* were inoculated with cultures of the following Trypanosomidae: *Leptomonas culicidarum, Herpetomonas muscidarum, Leishmania adleri* and *Trypanosoma cruzi.*

"*H. muscidarum* and *L. culicidarum* invariably produced fatal infections. Towards the end of the infection the haemolymph swarmed with flagellates.

"The course of the infection was characterized by a progressive diminution in the number of haemocytes together with a relative and absolute increase in phagocytic haemocytes. Macronucleocytes, micronucleocytes and giant cells were stuffed with parasites in various stages of disintegration. In addition, stationary phagocytes lining the haematocoelom were stuffed with ingested parasites.

"*L. adleri* produced a mild infection detected only by culture methods in 10 out of 31 larvae. In two larvae the infection was heavy, the haemolymph contained numerous flagellar and aflagellar parasites and the phagocytes contained L.D. bodies.

"Two strains of *T. cruzi* failed to infect the larvae."

FEVERS OF THE TYPHUS GROUP

In this section abstracts are arranged as far as possible in the following order:—general; louse-borne typhus, flea-borne typhus, mite-borne typhus; rickettsialpox; tick-borne typhus; Q fever, other rickettsial diseases.

DERRICK, E. H. & POPE, J. H. **Murine Typhus, Mice, Rats and Fleas on the Darling Downs.** *Med. J. Australia.* 1960, Dec. 10, v. 2, No. 24, 924–8, 2 figs. [17 refs.]

In 1925, an epidemic of murine typhus affected 200 persons in the Darling Downs, an important wheat-growing area in Queensland [this *Bulletin*, 1926, v. 23, 739]. The outbreak occurred in mid-winter and was associated with a plague of mice. Since 1925, cases of murine typhus have continued to appear in the area (27 in the period 1948–50 and 17 in 1951–59). The incidence has been highest in winter, and swarming of mice has been observed regularly during this season. *Xenopsylla cheopis* is rare at this time of the year. In 1959–60, unsuccessful attempts were made to isolate *Rickettsia mooseri* from 19 rats (*Rattus rattus*) and 80 mice (*Mus musculus*) collected in the area. Specific antibodies were not found in sera from these animals. It is suggested that the occurrence of human cases of murine typhus on the Darling Downs in winter may be due to the existence of a reservoir of infection in mice, contamination of the environment by the excreta of fleas, and inhalation of infected dust by man. *R. S. F. Hennessey*

VUKŠIĆ, L. Prilog medicinskoj geografiji Q-groznice u FNRJ. **[Contribution to the Medical Geography of Q Fever in Yugoslavia]** *Higijena.* Belgrade. 1960, v. 12, Nos. 2/3, 165–77, 4 maps & 5 graphs. [24 refs.]

Serological surveys carried out by means of the complement-fixation test on domestic animals in Yugoslavia have shown that sheep are the main source of Q fever infection in most parts of the country except Slovenia, with up to 5% of seropositive animals in certain areas. An infection rate of up to 10% is observed in goats, but cows, horses, dogs and poultry are practically unaffected. Human cases of Q fever are practically confined to the winter months, with a peak in February, whereas other diseases transmitted by animals (leptospirosis, anthrax, brucellosis, etc.) show a maximum incidence in the summer. The seasonal incidence of Q fever is apparently associated with lambing, and human cases occur mainly in areas in which there is a high incidence of infection among sheep. *D. J. Bauer*

KENNEDY, J. **Notes on a Recent Outbreak of Q Fever, January to June, 1959.** *Queensland's Health.* 1960, Feb., v. 1, No. 2, 24–9, 3 figs.

Queensland is the *fons et origo* of the discovery of the aetiological agent of Q fever, so it is understandable that special efforts are made in that State towards detection of cases of the disease. It is recorded that the number of cases rose from 76 in 1956–57 to 194 in the following year and to 410 in the year ending June 1959. This paper, by a health inspector from the Division of

Industrial Medicine, discusses an outbreak which began in an abattoir in Brisbane early in 1959 and which continued for several months. The works were new, modern and well-equipped, but in February 1959 a high degree of absenteeism from illness was noticed. Of an average labour force of 104, 58 acquired Q fever in a few months, which was confirmed by serological tests.

Cattle only are slaughtered and the daily treatment rate averages 260 head. The various stages in processing, from pre-slaughtering to the end products (meat, bone meal and tallow) are described and the layout of the different sections of the works, and their equipment, are shown in sketch plans, which also indicate the number of workers engaged and infected in each section.

It is not surprising that 17 of the cases occurred in the slaughter hall: 2 slaughterers previously employed there also had antibodies. It is likely that splashing of organs, water jets and particles thrown off by the circular saw were factors in the infective process. There were 5 cases out of the 6 hands in the edible offal room; here it seems that splashing at the chute from the slaughter hall was involved, and a similar factor probably operated in the gut room. It was surprising that 7 cases occurred among 9 workers in the maintenance and mechanical section. Enquiry showed that a safety device for releasing compressed air on the offal line to the digester discharged near roof level, thus exposing those on the floor to infection; probably frequent "blow-offs" infected several people. This shortcoming was remedied by the management. 6 of 13 workers in the boning and slicing room were positive, as were 2 of 3 meat inspectors. Other possible sources are mentioned.

Many of the workers were new and therefore presumably non-immune and furthermore up to 80% of the cattle were pregnant and thus the placenta was a potential source of infection.

The infection has now subsided and as most of the workers are probably now immune, only sporadic cases may be expected in the future. As there is a constant movement of labour within the industry, new hands will be potential victims.

The need for education of those in the industry and the use of better "housekeeping" methods are stressed, as is the economical importance of Q fever.

[This is an admirable study in the detection of sources of infection in a factory.] *H. J. O'D. Burke-Gaffney*

YELLOW FEVER

In this section abstracts are arranged as far as possible in the following order:—epidemiology, aetiology, transmission, pathology, diagnosis, clinical findings, treatment, control.

UTTLEY, K. H. **The Mortality of Yellow Fever in Antigua, West Indies, since 1857.** *West Indian Med. J.* 1960, Sept., v. 9, No. 3, 185–8.

Between 1857 and 1895 there were 100 deaths due to yellow fever in Antigua; 41 and 31 respectively occurred during the epidemics of 1857 and 1859 and thereafter only 1 to 6 deaths were recorded annually. The last case

was observed in 1895 (when there were 5 deaths). 69 deaths were in males and 31 in females, and the highest mortalities (35 and 27) occurred in December and January at the end of the rainy season when humidity was still high. 84 of the 100 deaths occurred in white persons although they rarely exceeded 4% of the population.

The author discusses the reasons for this pattern. There are no monkeys in Antigua to keep alive the sylvatic form of yellow fever, and no environmental changes among the people that might account for the decreased incidence. The author points out that the principal source of non-immune immigrants was formerly the large number of British military garrison troops. During and after the Crimea War, these troops were withdrawn and this coincided with the decrease in mortality from yellow fever. A similar course of events followed the recall of Danish troops from the islands of St. Thomas and St. Croix [this *Bulletin*, 1923, v. 20, 144]. The author suggests that in addition to the reduction in non-immunes a stage may have been reached when, for some reason, mosquitoes fell below the critical number necessary to maintain the disease; in fact the decline occurred long before any organized campaign for exterminating the mosquito was begun.

A similar situation has occurred in many of the Caribbean islands and yellow fever has now been absent long enough for the populations to have lost their immunity. *H. J. O'D. Burke-Gaffney*

RABIES

Nicolau, S. S., Drăgănescu, N., Nicolau, C., Ionescu, N. I., Fuhrer, B. & Gîrd, E. **Experimental Researches on "Silvered" Anti-Rabies Vaccine.** *Rev. Sci. Méd.* Bucharest. 1959, v. 4, 81–4. [10 refs.]

Rabbits are inoculated with the Babes strain of fixed rabies virus and when paralysed the brains are ground to make a 10% suspension in 0·15% silver nitrate. This is kept in the dark at room temperature for 24 hours; it is then diluted 2-fold with 1·8% chloruro-sodium [NaCl?]. This vaccine diluted 1 in 5 in saline immunized mice within a week or two of preparation but 1 month after preparation there was no activity [no details of the potency test used]. Centrifugation of the vaccine or decanting after standing removed excess silver and the supernatant retained activity for 3 months. 10 injections of this product into rabbits [? dosage] conferred immunity to intracerebral challenge [? dose] with fixed virus. This vaccine is said to be superior to Fermi vaccine and studies with the use of radioactive silver are said to demonstrate that the "silvered" virus is a live virus. [No experimental details of any value are given so that it is impossible to assess the value of the work reported.]

[See also this *Bulletin*, 1959, v. 56, 1023; 1960, v. 57, 901.]

C. E. Gordon Smith

CHOLERA

In this section abstracts are arranged as far as possible in the following order:—epidemiology, aetiology, pathology, diagnosis, clinical findings, treatment, control.

MUKERJEE, S., GUHA ROY, U. K. & RUDRA, B. C. **Studies on typing of Cholera vibrios by Bacteriophage. Part III: Phage Typing of Strains from Calcutta Epidemics of 1959.** *Ann. Biochem. & Exper. Med.* Calcutta. 1960, July, v. 20, No. 7, 181–8, 1 fig. [12 refs.]

Of the 88 cholera phages isolated in 1959 from stools of cholera patients, from cultures of cholera vibrios and from water sources 84 belonged to one or other of the 4 groups of cholera typing phages previously described by MUKERJEE and his colleagues [this *Bulletin*, 1958, v. 55, 651 ; 1960, v. 57, 122]. When 498 strains of *Vibrio cholerae* isolated from the 1959 Calcutta outbreaks were examined by the phage-typing scheme referred to above it was found that all the types and subtypes were represented in this series, consisting almost entirely of the serological subtype Ogawa. Approximately 90% belonged to phage type I and none of these was lysogenic ; most of the lysogenic strains were found to belong to phage type III.

Strains from the cholera epidemic in Bangkok which covered much the same period were all found to belong to a single phage type, also type I. This observation by itself may not be sufficient to establish the epidemiological value of phage typing of cholera vibrios, but the authors state, without giving precise details, that the scheme has proved to be of epidemiological value in the study of localized epidemics. *H. J. Bensted*

SEAL, S. C. **Some Preliminary Observations on Soluble Toxin of Cholera Vibrio.** *Ann. Biochem. & Exper. Med.* Calcutta. 1960, Aug., v. 20, No. 8, 205–16, 2 figs. [46 refs.]

When cholera vibrios were grown in a mutton infusion broth containing mannose for 18 hours at 37°C. under liquid paraffin (*i.e.* under anaerobic conditions) it was found that the bacteria-free culture filtrate was lethal to rabbits when injected intravenously after previous feeding of the filtrate to the animals kept in a fasting state. Filtrates of cultures grown aerobically were much less toxic. The preliminary oral administration of the toxic filtrate appeared to sensitize the animal and the intravenous dose brought about the toxic action leading to death ; the post-mortem findings suggest both a local and systemic effect which might indicate that 2 fractions were involved. The facts that sera from patients convalescent from cholera reacted with the toxic filtrate whereas sera from persons recently inoculated with heat-killed anti-cholera vaccine did not, suggest the possibility that the toxic substances may not be wholly endotoxin unless the difference in the two immune reactions is due to instability of the toxin or some fraction of it.

Although the author refers to the work of others who have approached the subject as microbiological chemists and attempted to isolate toxic fractions, no such attempt has been made in the work recorded in these preliminary observations. *H. J. Bensted*

HALDAR, D., GHOSH, B. K. & CHATTERJEE, A. N. **Observations on the Mode of Action of Antibiotics on** *Vibrio cholerae*. *Ann. Biochem. & Exper. Med.* Calcutta. 1960, July, v. 20, No. 7, 189–94, 2 figs. [35 refs.]

With papain digest broth and a single strain smooth culture of Inaba type *Vibrio cholerae* the growth curves of the organism in the control medium were compared with those obtained when various antibiotics were added. The antibiotics studied included penicillin, streptomycin, chloramphenicol and the tetracyclines. The broad-spectrum antibiotics were found to have a marked inhibitory effect on the growth of the vibrio at a concentration of 2·5 μgm./cc., whereas at that concentration penicillin and streptomycin or dihydrostreptomycin had little growth-inhibitory effect; it appeared to be necessary to increase the concentration something like 10 times to obtain comparable effects. In studying the inhibitory effect of different doses of chloramphenicol it was found that with a dose of 1 μgm./cc. (5 μgm. produces complete growth inhibition) there was inhibition of growth of *V. cholerae* with concomitant stimulation of ribonucleic acid synthesis. *H. J. Bensted*

NAYAK, K. P. & DUTTA, N. K. **Rôle of Essential Oils and Allied Drugs in Experimental Cholera of the Rabbit.** *Indian J. Med. Res.* 1961, Jan., v. 49, No. 1, 51–4. [11 refs.]

"Eight essential oils and thymol, menthol and camphor were tested both for their vibriocidal property and their efficacy in curing experimental cholera in the rabbits. Although oil of lemon grass and thymol were remarkably vibriocidal, yet they were ineffective against rabbit cholera. There was no relation between the vibriocidal activity of these oils and that of their ability to cure experimental cholera. The experimental findings indicate why these essential oils are no longer popular in the treatment of clinical cases of cholera."

GALLUT, J. Action de la chlorpromazine sur l'intoxication et l'infection expérimentales de la souris par la toxine et les vibrions cholériques. [**Action of Chlorpromazine on Experimental Intoxication and Infection with Cholera Toxin and Vibrios in Mice**] *Ann. Inst. Pasteur*. 1960, Dec., v. 99, No. 6, 813–20. [12 refs.]

Chlorpromazine in doses of 4–20 mgm./kgm. body weight, injected subcutaneously into mice 1 hour before they were given various preparations of cholera toxins, increased the severity of the experimental intoxication in all cases. Similarly, when the drug was injected into mice before they were inoculated with living vibrios the infections as compared with the controls were more severe. This contrasts with the antagonistic effect of the drug on the endotoxins of other bacteria [*Bull. Hyg.*, 1957, v. 32, 114, 903] but it does not appear that the action of chlorpromazine in the case of cholera toxin is related to the toxin preparations themselves. It is considered that it is due to an inhibitory action of chlorpromazine against the secretory activity of the suprarenal glands and also to its temperature-depressing effect. *H. J. Bensted*

AMOEBIASIS AND INTESTINAL PROTOZOAL INFECTIONS

In this section abstracts are arranged as far as possible in the following order:—epidemiology, aetiology, pathology, diagnosis, clinical findings, treatment, control.

JEVTIĆ, M. Naša iskustva kod bolesnika od intestinalne amebijaze. [**Experiences regarding Patients suffering from Intestinal Amoebiasis**] *Higijena.* Belgrade. 1960, v. 12, Nos. 2/3, 129–36. English summary.

The author has made an analysis of 264 patients suffering from amoebic dysentery who were mostly resident in the Belgrade area. Their ages ranged from 3 to 68 years, but most (38·3%) were in the 21–30-year age-group. The duration of illness was 1 month or less in 50 cases (20·1%), 1 year in 47 (18·9%), 5 years in 70 (28·2%) and more than 5 years in 31 cases (12·5%). The most frequent symptom was abdominal pain (87·1%), followed by diarrhoea (33·7%); 48 patients (18·1%) had had an appendicectomy. As a result of treatment clinical recovery alone was achieved in 3 patients (2·6%), parasitological recovery (disappearance of amoebae from the stools) alone in 77 (67·5%), both types of recovery in 22 (19·3%) and neither in 12 patients (10·5%). *D. J. Bauer*

ACEVEDO OLVERA, A., BIAGI F., F., ACEVEDO OLVERA, Josefina, CERECEDO CORTINA, V. & SANTOYO, J. Panorama amibiano. [**A Review of Amoebiasis**] Reprinted from *Rev. Med. Hosp. General.* Mexico. 1960, Mar., v. 23, No. 3, 167–221, 7 text figs. & 12 coloured figs. on 4 pls. [239 refs.] German summary.

This paper represents an attempt to survey the subject of amoebiasis throughout Mexico where it is a very serious disease. It is not possible to summarize so much observation in detail.

The authors review the Mexican literature on this subject during the last 25 years relating to 88,998 faecal examinations of which 23·9% were positive.

Among the many remarkable appearances of amoebiasis they include a cure of 2 cerebral abscesses and pericarditis secondary to hepatic abscess. They also describe a new method of investigation known as "intrahepatic pneumography" by which it was possible to diagnose multiple hepatic abscesses in 63% of cases. In 135,619 chest X-rays in the General Hospital, Mexico City, 0·9% showed liver abscesses. They also believe they are the first to report amoebic ulceration of the cervix uteri [but see TIXIER *et al.*, this *Bulletin*, 1928, v. 25, 217].

Some 1,200 patients with intestinal amoebiasis were studied. The more important syndromes were:

asymptomatic	34·7%
flatulence	13·8%
chronic intestinal stasis	12·6%
diarrhoeal syndrome	8·6%

In Mexico City intestinal amoebiasis occurs in about 13% and in the Republic the incidence of amoebiasis is between 23·6 and 27%. It has to be considered as a sanitary, economic and social problem.

Intestinal amoebiasis can produce metastases in all organs of the body.

A non-toxic preparation, Mebinol (chlorophenoxamide), gave a parasitic cure in 91·3%.

The individual syndromes and manifestations are reviewed at length.

[This paper is illustrated with some remarkable coloured plates.]

Philip Manson-Bahr

Canedo Acosta, J. Valoracion clínica de la clorofenoxamida en la amibiasis intestinal. [**Clinical Evaluation of Chlorophenoxamide in Intestinal Amoebiasis**] Reprinted from *Rev. Gastroenterología de México.* 1960, May–June, v. 25, 197–204.

The author, in Mexico, treated 68 patients suffering from chronic and 13 from acute amoebiasis with Mebinol. The first 25 of the patients with the chronic disease received 1,500 mgm. daily for 10 days. In 20, symptoms abated within a week and amoebic cysts were found to be absent at the first stool examinations on the 4th day of treatment and on repeated examination 10 days after the end of treatment. Because of the 5 failures in this series, the remaining 43 patients were given 2,250 mgm. daily for 13 days. All became negative clinically and parasitologically, but one relapsed or became reinfected, 4 months later.

The 13 patients with acute amoebiasis also received 2,250 mgm. daily for 13 days. In 6 of them, with severe manifestations, this was supplemented by an enema consisting of a suspension of 750 mgm. Mebinol in 250 ml. of water for 10 days. All were freed of parasites and symptoms.

No side effects were found which necessitated suspension of treatment. 45 patients suffered from flatulence and in half of them it was necessary to give absorbents, but the condition disappeared spontaneously when the treatment was completed.

All patients with the chronic disease had been treated unsuccessfully with other drugs and the author points out the advantages of Mebinol, particularly in view of its low toxicity and ample therapeutic margin.

H. J. O'D. Burke-Gaffney

Hanke, M. E. & Talaat, S. M. **The Biochemistry and Physiology of Henna (*Lawsonia alba*): its use as a Remedy for Intestinal Amoebiasis.** *Trans. Roy. Soc. Trop. Med. & Hyg.* 1961, Jan., v. 55, No. 1, 56–62, 3 figs.

Henna pigments were determined in extracts of ground leaves, in urine and in protein-free extracts of serum by making these alkaline with sodium hydroxide and measuring the optical density at 450 mμ. The serum concentration and urinary excretion of the pigments were recorded in dogs which were given large amounts of henna in their food. Several men were given intravenous injections of a protein-free sterile extract of the leaves and it was shown that clearance of the pigments by the kidney resembled inulin and creatinine clearance; the pigments were therefore not reabsorbed by the kidney tubules. Pigments determined by this method are apparently not derived from lawsone (2-hydroxynaphthaquinone), the main coloured constituent of henna.

One of the authors found that he could consume up to 30 gm. of ground henna leaves daily without side effects other than loss of appetite and frequent stools. 100 patients with intestinal amoebiasis, 42 of whom had ulcers seen with the sigmoidoscope, were then given daily doses of 3 gm. of ground henna in capsules. Treatment was continued for 15 days after stools and sigmoidoscopic examination had become negative. All patients became free from symptoms within a week, amoebae disappeared from the stools, the ulcers of 20 patients healed in 2 weeks and all healed in 6 weeks. Amoebic cysts reappeared in the stools of 7 patients, although symptoms did not recur. "A further course of treatment was effective." Anaerobic organisms disappeared from the stools although aerobic bacteria were unaffected. The authors therefore think that the amoebicidal action of henna may be an indirect one. Treatment of one man was discontinued after 3 days because of severe diarrhoea and 5 other patients passed frequent stools for a few days at the beginning of treatment. There were no other side effects.

[The clinical data presented in this paper are very sparse.]

L. G. Goodwin

DOXIADES, T., CANDREVIOTIS, N., TILIAKOS, M. & POLYMEROPOULOS, I. **Chronic Diffuse Non-Suppurative Amoebic Hepatitis.** *Brit. Med. J.* 1961, Feb. 18, 460–62, 4 figs. on pl.

Though acute amoebic "hepatitis", the forerunner of amoebic liver abscess, is recognized, no example of chronic amoebic hepatitis, without abscess formation, has hitherto been recorded.

In Athens a 32-year-old woman entered hospital because of right chest pain and slight fever. She gave a life-long history of episodes of abdominal pain with dysenteric diarrhoea, and during the German occupation she suffered from malnutrition with oedema of the legs. On admission she was still ill-nourished and oedematous; the right chest was dull and some turbid fluid was aspirated; the liver was enlarged downwards 6 fingers' breadth. There was some anaemia and the leucocyte count was 10,600 per cmm. A barium enema revealed no abnormality, and no parasites were identified in the stools.

After 23 days' ineffective treatment with streptomycin, the possibility of the trouble being a sequel of an amoebic colitis (diagnosed solely on the history) led to treatment with chloroquine for 5 days and then emetine for another 10 days. The former did not produce amelioration, but the latter led to remarkable betterment after 4 days, with virtual disappearance of the right chest effusion and shrinkage of the liver to normal size. The emetine treatment was therefore repeated after another week, and the patient was discharged apparently well.

She was readmitted after 4½ months with recurrence of the physical signs and the addition of ascites. Aspirated ascitic fluid yielded objects which were considered to be vegetative *Entamoeba histolytica*. [There are photomicrographs of these and of other slides showing the organisms.] Sigmoidoscopy, done as a result, showed engorgement and superficial ulceration of the rectal mucosa, but scrapings of these lesions did not yield parasites. A needle biopsy of the liver, however, showed in one area a couple of objects which were considered to be amoebae. Aspirated ascitic fluid was injected into the portal

veins of 3 guineapigs, and the animals were killed 17 days later; no relevant liver lesions were found. Into the parenchyma of the liver of another guinea-pig ascitic fluid also was injected, and on autopsy 17 days later an abscess was found in which objects which were considered to be amoebae were detected.

The patient was given another 10-day course of emetine, and after a week a further course of chloroquine treatment. These again produced prompt improvement, with marked reduction in the oedema and ascites. But on another needle biopsy of the liver, 16 days after these treatments, amoebae were still found in the interlobular connective tissue. A month after this an exploratory laparotomy showed a normal peritoneum, a normal liver, and a normal colon. Liver samplings taken at that time from both lobes gave sections histologically resembling those presented by the earlier needle biopsies; there were inflammatory foci in some interlobular spaces with giant cell formation, and a few amoebae were seen in these foci. These lesions the authors consider to be amoebic granulomata and the clinical condition they hold to be a chronic non-suppurative hepatitis resulting from a long-standing bowel infection. The amoebae in the peritoneal fluid may have reached it through the blood or lymph circulations, or by infiltration of the peritoneum. The validity of the diagnosis they consider is substantiated by the clinical [though apparently not parasitic] response to amoebicidal treatment.

[In the abstracter's opinion the microphotographs reproduced do not show the details on which he would rely to identify amoebae. The "conformations" identified by the authors as amoebae, as seen in the photomicrographs, could well be other structures. Furthermore, the continued presence of these bodies after repeated effective amoebicidal treatment is contrary to previous experience.] *A. R. D. Adams*

PAULLEY, J. W. **Amoebic Liver Abscess in Great Britain.** *Brit. Med. J.* 1961, Feb. 18, 462–3.

This primarily is a record of 2 cases of hepatic amoebiasis in persons who have not visited the tropics.

The first patient, a youth of 18 years, entered hospital in England in March 1959 with a diagnosis of retrocaecal appendicitis, but laparotomy failed to confirm it. At that time a chest X-ray examination showed raising of the right diaphragm; the leucocyte count was over 22,000 cells/cmm. He rapidly became very ill.

He had neither been in the tropics nor abroad, other than for two short holidays in Northern Europe. A couple of months earlier he had had "influenza" from which he made an indifferent recovery, only to relapse 3 weeks later, on this occasion with pain in the right lower chest posteriorly and subsequently in the right upper abdomen with pain on movement and on breathing. His temperature rose to 103°F. Subsequent to the laparotomy further X-ray examinations suggested the presence of a non-specific abscess of the liver. Antibiotic treatment failed to relieve this and his condition continued rapidly to deteriorate. He was put on emetine treatment, with prompt progressive improvement both symptomatic and physical; after 6 days of this he was given chloroquine treatment for 3 weeks; thereafter he was well, though the right diaphragm remained raised.

The second patient was a Pole, aged 44 years, who had always lived in

Europe, chiefly in France. In 1943 he had pneumonia with a right pleural effusion. In 1946 this recurred together with fever, a leucocytosis, and raising of the right diaphragm. He was admitted to hospital and failed to respond to penicillin and sulphonamide treatment. He had a rectal stricture, and gave a history of diarrhoea suggestive of a mucosal slough before the war. Needling of the liver yielded 30 ml. of " anchovy " pus, and emetine treatment resolved the liver condition.

The author gives some data relative to 15 other cases of amoebic liver abscess he has seen in Britain. All these differed from the two above in that they had been in the tropics or sub-tropics; all but one were men; some of them had been home for many (maximum 35) years. The " incubation " period was so long in some of these cases that the possibility of an indigenous origin of the causative infection might justly be entertained.

Any liver abscess in Britain merits suspicion of being amoebic in origin; emetine and chloroquine treatment therefore are equally as important as antibiotic treatment before resort is made to surgery. *A. R. D. Adams*

FRITZ, A. Zur Erkennung und Behandlung des tropischen Leberabszesses. 56 Fälle, behandelt in den Jahren 1953–1960. [**Diagnosis and Treatment of Amoebic Liver Abscess**] *Ztschr. f. Tropenmed. u. Parasit.* Stuttgart. 1960, v. 11, No. 4, 423–33. [46 refs.]

The English summary appended to the paper is as follows:—

" Diagnosis, differential diagnosis, and therapy of tropical liver abscesses—based on 56 cases from about 8,000 male patients under stationary treatment —are discussed.

" Concerning therapy, emetine and chloroquine gave the best results; antibiotics proved effective in treatment of secondary infections of previously punctured or drained abscesses only. Large abscesses, particularly if situated in the left lobe of the liver, require surgical treatment.

" Differential diagnosis may be rendered difficult if the focus is situated deep inside the right lobe of the liver; one surgical case is reported.

" In general, prognosis of tropical liver abscesses can be considered favourable. However, several ambulatory cures with chloroquine and Yatren or Enterovioform after releasing the patient from hospital are recommended to avoid recidivation, if the abscesses treated were large."

DELANOE, G. Un cas probable de péricardite purulente amibienne. [**A Probable Case of Purulent Amoebic Pericarditis**] *Bull. Soc. Path. Exot.* 1960, Sept.–Oct., v. 53, No. 5, 787–9, 2 figs. on pl.

A case in Casablanca. The patient recovered after treatment with emetine.

KERNOHAN, J. W., MAGATH, T. B. & SCHLOSS, G. T. **Granuloma of Brain probably due to** *Endolimax williamsi* (*Iodamoeba bütschlii*). *Arch. Pathology.* 1960, Nov., v. 70, No. 5, 576–80, 2 figs.

Amoebic infection of the brain is rare. HALPERT and ASHLEY [this *Bulletin*, 1945, v. 42, 126] found 61 records of brain abscesses caused by

Entamoeba histolytica. Most were secondary to amoebic abscesses of liver or lung but 4, and a fifth reported by themselves, were not. GREENFIELD and his associates (*Neuropathology*, London: Edward Arnold & Co., 1958, p. 211) consider that such abscesses are late manifestations of amoebic dysentery. There appears to be no record of a chronic granuloma of the brain due to *E. histolytica* infection.

With this background the present very exceptional case is described in a 6-year-old girl, living in Tucson, Arizona. At the age of 5 she had fallen and bruised the right parieto-occipital region. 6 months later craniotomy was performed, after which she improved, except for some incoordination. 3 months later a mass attached to the dura mater was removed. Her condition then gradually deteriorated and she died in November 1956.

Sections from tissue removed during the second operation showed a granuloma with lymphocytes and Langhans' giant cells around zones of caseation necrosis.

At autopsy it was found that the lesion involved the cortex and subcortical white matter and measured 5 × 3 × 3 cm. There were also some cystic spaces filled with grey gelatinous matter. In the granuloma itself were numbers of giant cells and, with cresyl violet and iron haematoxylin stains, amoeba were demonstrated. The cytoplasm when stained with haematoxylin and eosin was generally neutral and contained granules, some even phagocytosed nuclei, possibly of lymphocytes. The nuclei of the amoebae contained a large, prominent, centrally located karyosome resembling that of *Iodamoeba bütschlii*: this was well shown with cresyl violet. The amoebic trophozoites tended to accumulate in the perivascular spaces, especially in the wall of the granuloma. Some difficulty was experienced in the differentiation of the amoebae from the cells of cytomegalic inclusion disease. The amoebae as seen in the faeces are smaller than those found in the brain (8 to 20 μ, compared with 8 to 45 μ).

There is difficulty in explaining the mode of entrance of the trophozoite into the brain—possibly it occurs by the same route as *E. histolytica* in similar circumstances.

Endolimax williamsi (*I. bütschlii*) is considered non-pathogenic for human beings, but DERRICK [this *Bulletin*, 1949, v. 46, 41] reported a generalized infection, though it had not produced a chronic granuloma. [He also found *I. bütschlii* in the brain substance and, as demonstrated by C. M. WENYON, the invasive forms contained ingested red blood corpuscles, and in intestinal ulcers, as in *E. histolytica*, amoebae were found beyond the area of cellular reaction.]

Philip Manson-Bahr

VALLADA, E. P., ROSEIRO, A. M. & DE CARVALHO E SILVA, A. L. Um caso de isosporose humana em Botucatu. [**A Case of** *Isospora belli* **Infection in Botucatu, Brazil**] *Rev. Inst. Adolfo Lutz.* São Paulo. 1959, v. 19, 11–14, 2 figs. English summary (6 lines).

Among 7,010 examinations of faeces in the regional laboratory of the Instituto Adolfo Lutz in Botucatu between 1957 and 1959, the authors found *Isospora belli* in a white child of 3. Since other intestinal parasites were present, the patient's somewhat vague symptoms could not positively be

attributed to this parasite. The interest of the finding lies in the fact that it seems to be the first such recorded in the hinterland of the State of São Paulo.
H. J. O'D. Burke-Gaffney

COUTINHO, J. O. Contribuição para o estudo da *Giardia lamblia* Stiles, 1915. [**Study of** *Giardia intestinalis*] *Arquivos de Hig. e Saúde Pública.* São Paulo. 1960, Dec., v. 25, No. 86, 273–82, 2 graphs. [Numerous refs.] English summary (8 lines).

A general review and discussion.

RELAPSING FEVER AND OTHER SPIROCHAETOSES

OLISA, G. E. Experimentelle Untersuchungen über die Adaptation von Borrelien auf das debrütete Hühnerei. [**Experimental Studies on the Adaptation of** *Borrelia* **in the Embryonic Chick**] [Thesis.] 32 pp. [119 refs.] 1959. Hamburg 4: Bernhard-Nocht-Institutes für Schiffs- und Tropenkrankheiten.

The author gives a detailed historical summary of the history of relapsing fevers and the cultivation of spirochaetes and then describes experiments with an Egyptian strain of *Borrelia crocidurae* which was successfully cultivated in developing hens' eggs. The eggs were inoculated in various ways, a dentist's drill being used to cut through the shell, and the results are given in tabular form. Eggs that had been incubated 9 to 12 days, when inoculated with spirochaetes into the allantois, invariably showed organisms in the blood after an interval of 3 to 4 days but the amniotic fluid remained negative and only rarely were spirochaetes seen in the allantoic fluid. Similar results were obtained when the spirochaetes were inoculated into the amnion, the chorio-allantoic membrane, and intravenously into the embryonic veins. The organisms were most abundant in the heart blood, then in the brain, and less common in the lungs and liver. Inoculation into the chorio-allantoic membrane was found to give the most abundant growth and in all cases the infection was concentrated in the blood circulation. Passage from egg to egg was carried out without any difficulty but for this purpose the allantoic inoculation was found to be the most satisfactory. *Edward Hindle*

AESCHLIMANN, A. Complément à l'étude de l'embryologie d'*Ornithodorus moubata* (Murray). [**Further Study of the Embryology of** *Ornithodoros moubata*] [Miscellanea.] *Acta Tropica.* Basle, 1961, v. 18, No. 1, 58–60.

YAWS AND OTHER TREPONEMATOSES

HACKETT, C. J. **Some Epidemiologcal Aspects of Yaws Eradication.** *Bull. World Health Organization.* Geneva. 1960, v. 23, No. 6, 739–61, 1 fig. [50 refs.]

The conditions in which yaws may flourish are defined, notably as those in which peasants live in relative isolation and social stagnation with inadequate supplies of water and soap. For such areas to become infected immigrants with yaws in an infectious state are at first necessary. The natural history of an outbreak depends on the relative numbers of susceptible persons and infective subjects, thus a full cycle of yaws waxing and waning may take 40 to 60 years. In planning eradication schemes and estimating the degree of success obtained, full allowance should be made for these factors, together with seasonal variation and the influence of indirect factors such as incidental economic development.

If an accurate evaluation is to be made, clinical assessment of those suffering from yaws, particularly by division into initial, papillomatous, non-infectious early lesions, hyperkeratoses and late lesions, together with sero-reactivity, is desirable. Records of sero-activity in patients diagnosed as having early lesions (other than initial lesions) are a check on the accuracy of diagnosis and laboratory work. The number of positive sero-reactors without clinical signs will be a measure of those recently treated or of those with latent infection who may relapse with infectious lesions or with late lesions. The latter are of less epidemiological importance although some may be feebly infective.

Long acting penicillin (PAM), total mass treatment (TMT) [HACKETT, this *Bulletin*, 1957, v. 54, 46] or, where appropriate, juvenile mass treatment (JMT) or selective mass treatment (SMT), may prove successful but only if followed by re-surveys and treatment where necessary. Mass patient treatment (MPT), as practised in Indonesia, also gives successful results if frequent re-surveys and treatment can be provided, specially trained medical auxiliaries being adequate for this work. Bismuth and arsenic as given in the past are much less successful and after a few years yaws is likely to return in force unless social conditions have changed.

The time taken for reversal of sero-activity, either spontaneously or after treatment, is considered in detail. By analysing clinical and serological information obtained at any one time, particularly if some record exists of what previous treatment has been given, it may be possible to deduce whether yaws is decreasing or increasing or whether active transmission has ceased.

[This article should be studied by anyone planning a yaws eradication scheme or a yaws survey.] *Frederick J. Wright*

LEPROSY

In this section abstracts are arranged as far as possible in the following order:—epidemiology, aetiology, pathology, diagnosis, clinical findings, treatment, control.

HARTER, P. Quelques aperçus géographiques sur la maladie de Hansen. [**Some Geographical Aspects of Leprosy**] *Bull. Soc. Path. Exot.* 1960, Sept.–Oct., v. 53, No. 5, 841–7.

The author compares leprosy as found in several different countries: France, Equatorial Africa, the plains and the mountainous plateaux of South Vietnam, California (San Francisco), Japan and Mexico. He finds that in the countries and regions where the endemic index is low, the proportion of lepromatous (less resistant) type to the tuberculoid (more resistant) type is higher, contrary to what one would expect if the diminution or lower frequency of the disease were dependent on higher resistance to infection. Thus, for example in Japan with endemicity of 12,091 in 92,000,000 (0·13 per 1,000) there is a percentage of 67·3 of lepromatous type, while in the plateaux of Vietnam with 55 per 1,000 endemicity the proportion of lepromatous is 7·4% to 83·3% of tuberculoid. The author draws the conclusion that it is absurd to attempt an absolute and universal classification of leprosy without taking into account race, customs and geography. *Ernest Muir*

RUSSELL, D. A. **Leprosy in Papua and New Guinea.** *Papua & New Guinea Med. J.* Port Moresby. 1960, July, v. 4, No. 2, 49–54, 4 figs.

A survey of a preliminary nature shows incidence of leprosy per thousand to vary from 3·66 to 36·8 in the 9 areas mentioned. Patients of the lepromatous type are in the minority, and vary from 0·21 to 3 per 1,000 of the population examined. The infection appears to have spread from the Solomon Islands to New Guinea, and from Netherlands New Guinea to Papua. The policy for control appears to have fluctuated. Leprosy was treated in the Territory for at least 30 years; then in 1952–53 the Suppression of Hansen's Disease Ordinance was passed, by which all known cases were to be compulsorily segregated whether considered infectious or not; but since 1956 only open cases are sent to leprosaria and others are treated in villages. In 1958–59 there were 4 leprosy colonies in Papua where 231 patients were registered of whom 128 were discharged as suitable for out-patient treatment, and 307 patients received treatment outside. In the 7 colonies in New Guinea the corresponding figures were 1,623, 682 and 864. A description is given of the treatment which is in line with the usual treatment elsewhere.

In 1958 WHO gave a 6-months' fellowship for a leprologist to study in various centres, and in the light of the experience gathered the author discusses future policy of the leprosy campaign. This begins with an assessment of the leprosy problem through Medical Assistants and Infant Welfare Sisters, trained in the recognition and control of leprosy, who could detect cases while patrolling the districts. To this is added education of the public with the cooperation of the Department of Native Affairs. Treatment includes chemotherapy, physical therapy and rehabilitation. Out-patients are treated at a

"Hansenide Colony", District Hospitals, Mission Hospitals and at aid posts. There is particular difficulty in rehabilitation in the Highlands, especially among the Chimbu people where it is not easy to get ex-patients received back into the villages. The difficulties of rehabilitation, especially of those who live at great distances from aid posts, are discussed. *Ernest Muir*

DUNGAL, N. **Is Leprosy transmitted by Arthropods?** *Leprosy Review*. 1961, Jan., v. 32, No. 1, 28–35. [32 refs.]

In Iceland, Crete, and St. Croix (in the Caribbean) segregation was recommended by Dr. EHLERS in 1900. In the first two of these islands leprosy has died out, but not in the last. What factor makes the difference? The competitive effect of tuberculosis as suggested by CHAUSSINAND is not considered to give an explanation. Subclinical infection is considered as the possible mode of transfer of infection in those who develop the disease without history of contact. Insect transmission is next considered, and quotations from various authors who have incriminated different insects are detailed, the flea, louse, *Sarcoptes scabei* being taken into particular account. It is suggested that in a limited area or island with a fair incidence of leprosy "a thorough planned effort should be made to eradicate all skin arthropods, particularly in houses occupied or formerly occupied by leprosy subjects". [Perhaps sufficient stress is not laid upon differences in efficiency in carrying out public health policy as accounting for differences in success in eradicating leprosy.] *Ernest Muir*

FRENKEN, J. H. Twee kinderen met lepra. [**Two Children with Leprosy**] *Nederl. Tijdschr. v. Geneesk*. 1960, Nov. 5, v. 104, No 45, 2221–5, 5 figs. [12 refs.] English summary.

The author reports 2 cases of different forms of leprosy occurring in Mexican children of the same family. The first was a child aged 11 whose mother had died 5 years previously of diffuse leprosy and whose grandmother had suffered from the borderline form. The child's eyebrows became sparse and a week before the diagnosis was made the child had complained of severe headache, looked miserable, and did not wish to play. He had pain in the right lower leg. On examination the cheeks and wrists were thickened, the face was full-moon in appearance, there was oedema resembling myxoedema, the skin was shiny, dry, waxy and devoid of colour, and there were bald patches on the head and the eyebrows and eyelashes were absent. There were dilated veins in both popliteal fossae and the right groin. There was marked rhinitis and the mouth was open. The ulnar and auricular nerves were thickened. Sensation was unimpaired.

The histamine reaction was abnormal over the whole body. Histologically the picture was that of diffuse lepromatous leprosy. It is noteworthy how few dermatological manifestations were shown at the beginning. *Mycobacterium leprae* was not demonstrated.

The second patient was a child aged 5 years, the sister of the first patient. Two spots had developed on her neck and further spots were found on examination. There was no loss of sensation or thickenings, and the nose

was normal. The lepromin test was strongly positive 3 weeks later. Biopsy revealed typical tuberculoid leprosy but no organisms were found. The two children had slept in the same bed.

The author suggests that contact children should have periodic medical examinations which should include nasal smears and earlobe scrapings.

Anne Tothill

DAVISON, A. R. **Classification of Borderline Leprosy.** *Leprosy Review.* 1961, Jan., v. 32, No. 1, 43–7, 20 pls.

The author uses the following guides in classifying leprosy as borderline: lesions arise out of normal skin which is bacteriologically negative; there are immune areas formerly the sites of tuberculoid lesions; like tuberculoid lesions, those of the borderline form yield readily to the "triple treatment" [this *Bulletin*, 1960, v. 57, 484] consisting of DDS, Stibophen and mepacrine, while lepromatous lesions do not similarly yield; borderline cases take longer to heal than tuberculoid (2 years as compared with 5 months), but much more readily than lepromatous. In the reactional borderline the resistance of the patient may break down temporarily with a "shower of bacilli" throughout the body and the development of multiple, raised, erythematous, nodule-like plaques which are always bacteriologically positive. Several individual cases illustrating these points are described in text and photographs. *Ernest Muir*

JAMES, D. G. & JOPLING, W. H. **Sarcoidosis and Leprosy.** *J. Trop. Med. & Hyg.* 1961, Feb., v. 64, No. 2, 42–6.

There is evidence that sarcoidosis is relatively common in coloured races and is therefore of particular interest in the tropics. It is a systemic granulomatous disease of undetermined aetiology and pathogenesis, affecting mediastinal and peripheral lymph nodes, lungs, liver, spleen, skin, eyes, phalangeal bones, and the parotid glands. Sarcoid tissue consists of follicles of epithelioid cells with occasional giant cells but little or no central necrosis. It thus resembles the tuberculoid type of leprosy. The first step in differentiation is to test for anaesthesia, present only in leprosy. The examination of sections shows that the main difference is the presence of cellular infiltration inside the cutaneous nerves in leprosy of the tuberculoid type; but this is not so marked in the borderline form of leprosy, though in this form bacilli will generally be found. In both diseases the mucosae, hair, eyes and reticuloendothelial system are affected, but thickened nerves are found only in leprosy. In leprosy bone changes are common while in sarcoidosis there are only "innocent punched-out phalangeal cysts". There may be sarcoidal changes in the lungs, but seldom if ever are the lungs affected in leprosy. Reactional states are distinct in the 2 diseases; in sarcoidosis, the erythema nodosum lesions do not occur in crops and are usually confined to the legs. The Kveim test provides strong evidence of sarcoidosis. Corticosteroids cause temporary or permanent suppression of the signs of sarcoidosis, but only when the disease is active. In leprosy they are effective only in the reactional phase. *Ernest Muir*

ANDERSEN, J. G. **Plantar Ulcers in Leprosy: their Pathogenesis and Natural History, and their Therapy and Prevention.** *Leprosy Review.* 1961, Jan., v. 32, No. 1, 16–27. [14 refs.]

The first section of this paper describes the pathogenesis of plantar ulcers, and the second deals with treatment and prevention. "The static foot meets pure pressure, the kinetic foot meets pressure plus shear." The shear is tranverse, longitudinal and rotary. In the leprosy patient's foot there are anaesthesia, motor paralysis and skeletal changes, and the effects of these in causing plantar ulcers under the pressure and shear of walking are discussed in detail. It is considered that most plantar ulcers develop as "closed ulcers" with secondary breakdown into open ulcers, often after a long period. Ulcers may first be started by penetration by thorns, nails, etc., or by unsuitable shoes. Sitting cross-legged may cause ulcers of the lateral malleolus.

Under "Therapy" it is stressed that "*every anaesthetic foot is ulcerliable*" because the patient has lost the normal warning mechanism of the foot. If an ulcer does occur it must be treated immediately. In discharging ulcers daily soaks in saturated magnesium sulphate solution are recommended; there is usually no indication to use sulphonamides or antibiotics. Dry ulcers are considered under "Corns", "Cracks" and "Protective Footwear". The latter should have a resilient insole, be moulded to distributed pressure, and be rigid to prevent angulation. But "It is important to impress upon the patient . . . that *shoes are preventive and not curative*". Surgical interference should if possible be postponed until the quiescent phase. Care should be taken not to remove viable bone. Operations are aimed at healing ulcers, correcting paralytic deformities, and correcting skeletal deformities.

[References are made to the series of articles on this subject by E. W. PRICE (this *Bulletin*, 1959, v. 56, 729, 1143; 1960, v. 57, 139) and this paper should be read in conjunction with these.] *Ernest Muir*

ELLARD, G. A. **Biochemical Aspects of the Chemotherapy of Leprosy.** *East African Med. J.* 1960, Dec., v. 37, No. 12, 765–75. [23 refs.]

This paper is a broad but not detailed review of the chemotherapy of leprosy. It is introduced with a brief summary of the history of leprosy, followed by an account of the role of antimetabolites in antibacterial chemotherapy and the properties that are necessary for an antibacterial drug to be chemotherapeutic. Finally, the drugs that are used in the treatment of leprosy are briefly discussed as to their efficiency, absorption and excretion and conversion to metabolites.

The 23 references given as a selected bibliography are not used specifically to support statements in the text. *S. R. M. Bushby*

DREISBACH, J. A. & COCHRANE, R. G. **A Three Year Clinical Evaluation of Dalacin in the Treatment of Lepromatous Leprosy.** *Leprosy Review.* 1961, Jan., v. 32, No. 1, 48–56. [13 refs.]

Because of encouraging results obtained in the experimental treatment of tuberculosis with Streptovaricin in laboratory animals the authors arranged its

trial in 4 patients with advanced lepromatous leprosy. With 1 exception all were previously untreated. They were given 3 gm. on 6 days a week for 3 years. Details are given of each case. The drug was found to be well tolerated and non-toxic. There was marked clinical improvement and the bacterial index came down from 5·2 to 2·6; but nasal lesions persisted. It is concluded, however, that Streptovaricin has little effect on *Mycobacterium leprae*, and that it is not worth while making a further trial. *Ernest Muir*

McGregor, H. **A Preliminary Trial of Etisul in Treatment of Leprosy Patients.** *Leprosy Review*. 1961, Jan., v. 32, No 1, 36–9, 3 charts.

29 patients in Sarawak, all of whom had been previously treated for an average of 9 months with DDS, and 3 with DPT, were put on a 12 weeks course of Etisul, other drugs being stopped meanwhile. At the end of that period the average bacillary index had diminished from 0·83 to 0·34, and since then with the exception of 3 patients all have become negative bacteriologically. Even 1 patient who had to stop the inunction of Etisul after the 10th occasion because of severe reaction has now become negative. Clinical improvement was also very marked, and the patients had a feeling of well-being. Gentle and persistent inunction over a wide area was found better than rubbing with too much vigour. The patients did not object to the garlic-like odour of the drug. It is hoped to arrange a further trial of Etisul under controlled conditions. *Ernest Muir*

Davison, A. R. **A Clinical Evaluation of Etisul.** *Leprosy Review*. 1961, Jan., v. 32, No. 1, 40–42, 1 graph.

In July 1959, 86 leprosy patients in Pretoria, South Africa, were chosen for a controlled trial of Etisul. They were all given 100 mgm. daily of DDS and 2 gm. daily of DPT for 6 days each week. Then 33 of these patients were also inuncted with Etisul twice a week, and 20 were inuncted 5 times a week, the remaining patients acting as controls. The trial lasted for 12 months.

In all groups there was slight clinical improvement. The Lesion Index fell from 6·6 to 4·8 in Group I, from 7·1 to 4·9 in Group II, and from 5·8 to 4·5 in Group III. The author differs from Davey [this *Bulletin*, 1959, v. 56, 1146] and other workers and considers that the granulation or disintegration of bacilli under treatment has no significance, and he claims that other drugs similarly cause this disintegration as does Etisul [*ibid*., 1956, v. 53, 67]. The author also uses a different method from other workers in assessing the amount of bacilli present. *Ernest Muir*

Browne, S. G. & Ridge, E. **Toxic Epidermal Necrolysis.** *Brit. Med. J.* 1961, Feb. 25, 550–53. [11 refs.]

"Two typical cases of 'toxic epidermal necrolysis' are reported in which phenolphthalein and dapsone were respectively the causative drugs. Both patients had hypermelanotic fixed eruptions caused by the drugs, and both

experienced more than one attack of the syndrome, each attack being apparently precipitated by the agent in question and affecting the skin of all four limbs. The mechanism is apparently allergic."

De Souza-Araujo, H. C. A profilaxia da lepra no Brasil. I Parte. Contribuição do autor, durante 40 anos, para a sua Solução. **[Prophylaxis of Leprosy in Brazil. I. The Author's Contribution to its Solution over 40 Years]** *Rev. Brasileira Med.* Rio de Janeiro. 1960, Apr., v. 17, No. 4, 309–13. II Parte. Resultado de 30 anos de combate à lepra no Brasil. **[II. Results of 30 Years' Experience of Leprosy Control in Brazil]** *Ibid.*, May, No. 5, 404–6.

Menezes, D. Comentários e sugestões de uma campanha anti-leprótica baseados em nossa experiência de 21 anos no dispensário de Uruguaiana. **[Commentaries and Suggestions for an Antileprosy Campaign based on our 21 Years' Experience of Dispensaries in Uruguay]** *Bol. Serviço Nac. de Lepra.* Rio de Janeiro. 1960, Sept., v. 19, No. 3, 223–35.

Of the 101 leprosy patients registered in the Uruguayan Health Centre between 1939 and 1959 it was possible to discover the source of infection in only 33. Of the 101 patients 57·4% came spontaneously to the skin clinic, 21·8% came after notification, and 20·8% were found as contacts of known cases. Contacts are kept under supervision, and are examined from time to time; but it is suspected that there are concealed cases because of the large proportion of patients the source of whose infection cannot be discovered.

In a group of 250 contacts with leprosy 98·4% became positive in reaction to the Mitsuda test after BCG vaccination. Of 316 child contacts with leprosy, who were vaccinated with BCG, only one developed leprosy, while 32 of 134 who were not vaccinated became infected, giving a figure 77 times greater for the unvaccinated.

Taking advantage of these and other experiences over a period of 20 years, the author makes a number of suggestions for the control of leprosy in Uruguay. It is suggested that the service of skin clinics be enlisted in examinations for leprosy throughout the country. Among the 4,000 patients seen in four years in a travelling skin clinic 4·5 per thousand leprosy patients were found. Compulsory internment of open cases should not be resorted to. Patients with undifferentiated and minor tuberculoid leprosy should be vaccinated with BCG. Lepromatous patients should also be thus vaccinated in order to make their lepra reactions less frequent and severe. General practitioners should be trained to recognize leprosy, and the general public should be taught its nature. It is also suggested that all contacts with leprosy patients should be vaccinated with BCG. *Ernest Muir*

HELMINTHIASIS

In this section abstracts are arranged as far as possible in the following order:—TREMATODES (*schistosomes, other flukes*); CESTODES (*Diphyllobothrium, Taenia, Echinococcus, other cestodes*); NEMATODES (*hookworms, Ascaris, filarial worms, Dracunculus, etc., Trichuris, Enterobius, Trichinella, etc.*).

DING, L. K. & SUTLIVE, Jane. **The Use of Dithiazanine Iodide in the Treatment of Multiple Helminthiasis in Sarawak, Borneo.** *Amer. J. Trop. Med. & Hyg.* 1960, Sept., v. 9, No. 5, 503–5.

Routine hospital stool examinations in Sarawak showed that 59% of 858 patients were infected with one or more of: *Ascaris lumbricoides*, *Trichuris trichiura*, *Ancylostoma duodenale*, *Strongyloides stercoralis*, *Hymenolepis nana* and *Enterobius vermicularis*.

The authors treated 35 patients (21 male, 14 female, aged 11 to 65 years; 6 Chinese, 1 Malay and the others from indigenous tribes) who were infected with the first 3 species just mentioned in various combinations. The dose was 200 mgm. three times a day in the form of 100 mgm. enteric-coated tablets given after meals for 1, 2, 3, 4 or 5 days without preparatory or subsequent treatment. Egg counts were done by the Stoll method before and usually 1 to 2 days after treatment. A table shows the results and should be consulted for details.

The activity of the drug against *Trichuris* and *Ascaris* was significant. There were no *Trichuris* eggs in the stools of 16 out of 20 patients (80%) treated for 5 days nor in the stools of 1 patient treated for 3 days nor in the stools of 2 out of 7 treated for 2 days. The stools of 2 patients treated for 1 day showed an 85% reduction of the egg count and those of 7 treated for 2 days showed a reduction of 74%. The overall reduction of *Trichuris* egg counts was 45%.

In the stools of 2 patients treated for ascariasis for 1 day there was no significant change in the egg counts. Of the stools of 7 treated for 2 days, one was negative and the others showed a 43% reduction. There were no *Ascaris* eggs in the stools of 1 patient treated for 4 days and there was a 73% reduction of the egg count in the stools of 18 patients treated for 5 days. The overall reduction of the *Ascaris* egg count was 55%.

There was no activity against *Ancylostoma duodenale*. There was, in fact, an overall increase of 54% in the egg counts of 26 patients treated.

The side effects were: nausea only in 3 of the 35 patients treated, nausea and vomiting in 11 and persistent and severe vomiting, which made it necessary to discontinue treatment, in 4.

The literature is discussed and the authors conclude that the drug is not suitable for mass treatment for hookworm control because of its side effects and lack of activity against these worms. *G. Lapage*

WARREN, R. M. **Bilharzia in a Patient with Gonorrhoea.** *Brit. J. Venereal Dis.* 1960, Dec, v. 36, No. 4, 270–72, 3 figs.

The patient was a sailor from Iraq seen in Southampton.

MORRISON, A. I. **Bilharzial Cystitis.** *Brit. J. Venereal Dis.* 1960, Dec., v. 36, No. 4, 268–9, 1 fig. [11 refs.]

Two cases were seen in Arab immigrants in Sheffield.

ALVES, W., HARPER, J. & HILL, J. **Preliminary Field Trials with M & B 2948A in *Schistosoma haematobium* Infections in Man.** *Trans. Roy. Soc. Trop. Med. & Hyg.* 1961, Jan., v. 55, No. 1, 40–43. [10 refs.]

M & B 2948A (1-*p*-aminophenoxy-5-phthalimidopentane) [this *Bulletin*, 1960, v. 57, 49; 1961, v. 58, 81] was given to 187 African children and adolescents with *Schistosoma haematobium* infections in Southern Rhodesia. The courses of treatment were oral and extended over 2 to 5 days; the total dosages of the drug varied from 120 to 370 mgm./kgm. of body weight. The patients lived normal lives during the treatment and the drug was given once, or twice, daily under supervision at schools. Card tests of visual acuity were undertaken before, during and after the treatment. Urine was examined by miracidial hatching tests on terminal specimens of urine collected after exercise. The patients were re-examined by this means for 3 months after treatment.

64 (37%) of the 173 patients were presumptively cured (negative miracidial hatching tests) as a result of the treatment; but there was a decrease in the amount of blood and an increased proportion of degenerate eggs, with reduced miracidial hatching, in the urines of many of the remaining patients. None of the dosage schedules used proved therapeutically superior to the others. There was no sign of serious intolerance to the drug though occasionally there was minor nausea, with abdominal discomfort and backache. There was no evidence of visual disturbances. Although the presumptive cure rate achieved with this drug was disappointing it was clear that it did exert an anti-schistosomal action; it seems that it could be used in mass treatment without danger to the patients. *A. R. D. Adams*

NAVARRANNE, P., DODIN, A., BERTRAND, E. & CAPRON, A. L'atteinte du foie dans la bilharziose intestinale. A propos de deux observations cliniques, biologiques et histopathologiques. [**Liver Involvement in Intestinal Schistosomiasis. A Study of Two Cases**] *Méd. Trop.* Marseilles. 1960, Nov.–Dec., v. 20, No. 6, 722–9, 3 figs. [25 refs.]

There are 3 schools of thought on the nature of the liver involvement complicating intestinal schistosomiasis. One is that it does not cause sclerosis [this *Bulletin*, 1957, v. 54, 1202]; the second is that capillary lodgement of an egg following embolism causes a strictly local sclerosis around it [*ibid.*, 1957, v. 54, 711]; the third is that a true cirrhosis can result from *Schistosoma mansoni* infection [*ibid.*, 1959, v. 56, 1251, 1252]. Most recent workers favour this last view.

This is an account of 2 patients in Madagascar, one a woman of 50 years and the other a girl of 12 years, with *S. mansoni* infections. The woman originally was thought to have cancer of the rectum and the girl was suffering from Banti's syndrome.

In the woman rectoscopy revealed a tumour which on biopsy yielded *S. mansoni* eggs; there was a hypertrophied liver from which a needle biopsy specimen yielded eggs, one of them embolizing a portal venule and the others within inflammatory nodules in the liver parenchyma; there was a hyperplasia of the Kupffer cells, which were not pigmented. Under treatment with anthiomaline and stannous oxide the woman's general condition improved and the rectal lesions resolved; but the liver function abnormalities and enlargement persisted.

In the girl both the liver and the spleen were much enlarged, with marked evidence of hypersplenism; there was ascites and some oedema of the lower extremities. Liver function tests were abnormal and biopsy showed disseminate inflammatory nodules around *S. mansoni* eggs with a fibroblastic reaction extending into the liver parenchyma and periportal sclerosis. The portal pressure was only 13 cm. Palliative treatment in conjunction with specific treatment as given to the woman produced disappearance of the oedema and ascites; but the enlargements of the liver and of the spleen persisted. A repeat liver biopsy showed the inflammatory lesions to have gone; but centrilobular fibrous nodules and the bands of sclerosis remained; the picture was that of cirrhosis.

A splenectomy was undertaken; the spleen was found to be adherent to surrounding structures; no eggs were found in the organ. On discharge from hospital 6 weeks later the liver was still enlarged, but the general condition had much improved and there was no oedema or residual evidence of hypersplenism; the liver function test abnormalities had diminished; there was no evidence of persistence of the worm infection, in the form of schistosome eggs in the stools.

The authors conclude from their observation of these cases that the liver undoubtedly can be damaged both functionally and anatomically in intestinal schistosomiasis, and that in consequence a progressive and permanent diffuse cirrhosis develops duly resulting in portal hypertension. Needle liver biopsy is a very effective means of recognizing this schistosomal liver involvement. In *S. japonicum* infections it has been claimed that it is a more effective means of establishing the presence of the infection than is stool examination, but the authors hesitate to affirm that this is true in *S. mansoni* schistosomiasis.

A. R. D. Adams

Piza, J. de T., Ramos, A. da S., Brandão, C. S. H. & Figueiredo, C. G. A esquistossomose no vale do Paraíba (Estado de São Paulo—Brasil). Observaçoes sôbre a doença em alguns dos seus municípios e a fauna planorbídica da região. [**Schistosomiasis in the Paraíba Valley, Brazil**] *Rev. Inst. Adolfo Lutz.* São Paulo. 1959, v. 19, 97–143, 18 figs. [13 refs.] English summary.

This survey was made between 1957 and 1959 in that great part of the Paraíba Valley region which is situated in the State of São Paulo. An introduction describes the area and illustrates it with a map. The epidemiological situation is discussed and details are given of the organization of the survey and of the control measures undertaken. Several photographs illustrate points of interest.

Surveys of snail hosts were carried out in 20 districts. In 282 collections, 47,599 snails were obtained, of which 99% were *Taphius* [*Australorbis*] *nigricans*. Of 33,784 examined for *Schistosoma mansoni* infection, 112 were positive. *T. janeirensis*, *Taphius* sp., *Drepanotrema melleum* and *D. cimex* were also found but in small numbers.

Autochthonous cases of schistosomiasis, 401 in all, were found in São José dos Campos, Caçapava, Taubaté, Pindamonhangaba, Roseira and Aparecida. These findings are tabulated and the infected persons are classified in age-groups. The findings in each focus are discussed fully.

The authors describe at some length the control measures undertaken which included treatment of patients, control of snails by chemical and biological methods, and environmental sanitation. Comprehensive methods of health education were employed.

This full survey was a cooperative effort between the Division of the Servico do Interior, the Malaria Eradication Service and the regional laboratory of the Instituto Adolfo Lutz at Taubaté. *H. J. O'D. Burke-Gaffney*

Coda, D., Falci, N. & Mendes, F. A. T. Contribuição para o estudo e a profilaxia da esquistossomose mansônica no estado de São Paulo. [**Study of *Schistosoma mansoni* and its Control in the State of Sao Paulo, Brazil**] *Rev. Inst. Adolfo Lutz*. São Paulo. 1959, v. 19, 25–68, 1 map & 1 graph. [Numerous refs.] English summary.

This study records at great length a study of schistosomiasis in the State of São Paulo. A survey for snail hosts revealed the presence of 3 species of *Drepanotrema* and 4 of *Taphius* [*Australorbis*, this *Bulletin*, 1958, v. 55, 1134]. Natural infection by *Schistosoma mansoni* was found in *Taphius nigricans* and in *T. glabratus*. The findings are tabulated for the 26 districts in which these snails were found. In examinations made in the city of São Paulo, in Santos and in São Vicente, 2,540, 117,323 and 4,723 snails examined respectively showed indices of infection of 0·47%, 0·39% and 0·36%. Details are given of individual foci. Surveys in 2 centres of persons from northern, north-eastern and central states of Brazil showed faecal infection with *S. mansoni* eggs in 20% and 26%. Tables list the findings in persons arriving in São Paulo from other states of Brazil and this problem of immigration and its significance in relation to schistosomiasis is discussed at length, with detailed reference to the various measures of prevention. Thousands of persons entering São Paulo from other states are active carriers of *S. mansoni* and several autochthonous cases have been found both in coastal and highland areas.

The authors recommend intensified surveys for snails throughout the State, with the aim of effective control. Eradication requires the cooperation of the Federal Government and State Governments and systematic medical examination of immigrants should be made. Where immigrants are shown to be carriers, local health authorities should be notified and they in turn should exercise surveillance of these infected persons.

There is a considerable reference to previous Brazilian work on schistosomiasis. *H. J. O'D. Burke-Gaffney*

FRAGA DE AZEVEDO, J. & PEQUITO, Margarida G. A influência do tipo de fecundação (autofecundação e fecundação cruzado) na evolução do *Australorbis glabratus*. [**Influence of Type of Fertilization (Autofertilization and Cross-Fertilization) on the Development of** *Australorbis glabratus*] Reprinted from *Garcia de Orta*. 1960, v. 8, No. 2, 273–7. English summary.

PELLEGRINO, J. & MEMORIA, J. M. P. A reação intradérmica na esquistossomose mansoni. IV. Aspectos quantitativos da reação cutânea ao antígeno de ôvo de *S. mansoni*. [**The Intradermal Test in** *Schistosoma mansoni*. **IV. Quantitative Aspects of the Test using Egg Antigen**] *Rev. Inst. Med. Trop. São Paulo*. 1960, Sept.–Oct., v. 2, No. 5, 260–64, 2 figs. English summary. V. Resposta cutânea do tipo tardio. [**V. Delayed Cutaneous Response**] *Ibid.*, 265–7. English summary.

IV. Continuing their work on intradermal (ID) tests in *Schistosoma mansoni* infections [this *Bulletin*, 1961, v. 58, 79, 336], in the first part of this report the authors studied the quantitative relationship between dosage and the skin response to an antigen made from ova.

2 groups of patients were tested: (A) 50 adult males aged between 20 and 40 years, and (B) 20 adult males who had previously given positive reactions to antigens made from cercariae and adult worms. The antigens used were diluted 1 in 10^2, 1 in 10^3, and 1 in 10^4; 0·05 ml. of each dilution was injected ID and the result read 15 minutes later; wheals of 1·2 cm.^{2} or more were considered positive, and those 0·9 cm.^{2} or less, negative.

In group A the 1 in 10^4 dilution gave wheals of 1·4 cm.^{2} but the averages of the 1 in 10^3 and the next higher dilution were smaller than with antigens made from cercariae or adult worms in the same dilutions. For group B there was a direct linear relationship between size of wheal and dilution and even at 1 in 10^3 or 1 in 10^4 the percentage positive was 90 or more. The authors consider that the skin response to an antigen made from ova is a function of the concentration of the antigen, so it should not be used as a test for control of cure.

V. To test the delayed cutaneous response, 146 patients in Belo Horizonte, all with proved *Schistosoma mansoni* infections, 95 of them aged 10–15 years, and the remainder male adults, were given 0·05 ml. ID of an antigen made from adult worms diluted 1 in 10^3. The results were read twice: first 15 minutes after (immediate reaction) when the size of the wheal was measured, and then 24 hours later (delayed reaction) when its *volume* was determined by a special formula; wheals of 1·2 cm.^{2} or more were considered positive. The results were as follows. 48 children gave immediate positive reactions and 23 gave delayed reactions. 2 who gave immediate negative reactions gave delayed positive reactions. 15 of the 23 children who gave delayed positive reactions had given immediate positive reactions, and 6 who gave doubtful immediate reactions gave delayed positive reactions (included among the 23 delayed positives). Of the adults 36 gave immediate and 15 gave delayed positive reactions; none of those who gave immediate negative reactions later gave positive reactions but 1 doubtful did.

The authors consider that the delayed reaction occurs fairly frequently

though the percentage is too low for the test to be of much value in diagnosis, and practically all those giving a late reaction were positive after 15 minutes. There was no significant difference in the percentage of delayed reactions and their intensity between children and adults, and the delayed reaction seems to some extent to be independent of the immediate reaction.

Both the immediate and delayed reactions were negative in 20 children without schistosomiasis. *W. K. Dunscombe*

MAGALHÃES, A., Jr. & COUTINHO-ABATH, E. Lesões esplênicas iniciais na esquistossomose mansônica humana. [**Initial Splenic Lesions in Human Manson's Schistosomiasis**] *Rev. Inst. Med. Trop. São Paulo.* 1960, Sept.–Oct., v. 2, No. 5, 251–9, 6 figs. [17 refs.] English summary.

This is a report on the histology of spleens removed at operation from 41 young persons aged between 5 and 21 years, all of whom were suffering from a *Schistosoma mansoni* infection but from no other condition. During the operation a portion of the liver was also removed from each patient and examined histologically to determine the extent of hepatic change.

The authors point out that practically all the descriptions of the histology of the spleen in this disease have been from spleens obtained at necropsy and hence usually in the final stages of the disease. Here, after splenectomy the spleens were weighed and stained sections of 6 μ thickness were examined to determine the number of lymphoid follicles per square cm. 8 spleens obtained from the anatomy department of the University of Recife were used as controls.

It was found that there was a strong positive correlation between the weight of the spleen and the age of the patient, which was quite independent of the normal rate of growth. The histological appearances varied from a simple hyperplasia of the reticular and lymphoid elements, progressing through a definite cellular hyperplasia at the expense of the follicles, to extensive fibrosis. Congestion seemed to be the prime factor in the later stages of the disease, and the authors consider that initially the splenomegaly is the result of a reticular hyperplasia due to the aggressive, irregular, and often repeated action of allergenic substances from the parasite and its eggs, and their repetition is the essential cause of the splenomegaly, the mobilization of the lympho-histiocytic elements finally leading to a stage of exhaustion followed by the gradual transformation into an extensively fibrotic state. *W. K. Dunscombe*

STIREWALT, M. A **Chronological Analysis, Pattern and Rate of Migration of Cercariae of *Schistosoma mansoni* in Body, Ear and Tail Skin of Mice.** *Ann. Trop. Med. & Parasit.* 1959, Dec., v. 53, No. 4, 400–413, 22 figs. on 4 pls. [25 refs.]

Schistosomulae of *Schistosoma mansoni* were followed through abdominal, ear and tail skin of mice in serial sections of biopsies taken 5 minutes to 11 days after the application of cercariae.

The cercariae usually entered surface irregularities in the stratum corneum, then went along the junction between the epidermis and the dermis, down the pilo-sebaceous apparatus, into the sebaceous gland, along the follicles, then into the surrounding venules or lymphatics or into the papillae near the follicles, and then into the subcutaneous veins or lymphatics.

The cercariae might penetrate through the epidermis into the veins or lymphatics without going down the hair follicle, or they might go down the hair shaft in the follicle, or along the paths of the previous cercariae, or they might wander through the subcutaneous tissues and move back to the epidermis, having penetrated more deeply.

They seem to move along the paths of least resistance along tissue spaces and in already used tunnels. Several cercariae might migrate in a common tunnel.

The rate of migration varied in different types of skin. The dermis of the abdominal skin was penetrated within 3 minutes, and invasion of the veins or venules occurred within 2 days. The skin of the ear was invaded in a similar time and the veins of the ear in 3 days. The skin of the tail was penetrated in an hour, and the veins within 5 days. No parasites were found in abdominal skin after 4 days, in the ear skin after 5 days, but they remained in the tail skin for at least 11 days. Most of the parasites remaining were necrotic and were within fibrosed vesicles.

[See also this *Bulletin*, 1957, v. 54, 838.] *W. E. Kershaw*

BRENER, Z. Quimioterapia da esquistossomose experimental. IV. Atividade terapêutica do etileno-diamino-tetracetato de antimônio e sódio. [**Chemotherapy in Experimental Schistosomiasis. IV. Therapeutic Activity of Sodium-Antimonyl-Ethylene-Diamino-Tetracetate**] *Rev. Inst. Med. Trop. São Paulo*. 1960, Sept.–Oct., v. 2, No. 5, 268–71, 1 fig. English summary.

The efficacy of sodium-antimonyl-EDTA was studied in mice experimentally infected with cercariae of *Schistosoma mansoni*, in a series of tests as follows.

(1) One group of mice received 25 mgm./kgm. of the drug intraperitoneally 45 days after the infection, for 5 consecutive days. 7 days later the animals were killed and the number of worms throughout the portal system counted in them and in untreated controls. (2) In another group the drug was given in the same amounts for the same length of time, but in one lot starting from the 35th day and in the other from the 45th day after infection. The animals were again killed on the 7th day after the end of treatment and the adult worms from treated and control mice recovered and the livers examined for granulomas. (3) In order to determine the CD50 dose 3 groups were treated similarly with 25 mgm./kgm., 37·5, and 50 mgm./kgm. in 2 series 35 and 45 days after infection. The CD50 was found to be approximately 44 mgm./kgm. and the relationship LD50:CD50 1·9:1, a value greater than that obtained with the usual Sb preparations; even 25 mgm./kgm. caused a reduction in the number of worms found.

The author considers that in view of the considerable activity shown by this compound a detailed study of its chronic toxicity should be made, and other chelating compounds tested.

[For part III, see this *Bulletin*, 1961, v. 58, 338.] *W. K. Dunscombe*

Hsü, S. Y. Li & Hsü, H. F. **On the Virulence of the Geographic Strains of** *Schistosoma japonicum*. *Amer. J. Trop. Med. & Hyg.* 1960, Mar., v. 9, No. 2, 195–8.

The authors have previously shown that the strains of *Schistosoma japonicum* from China, Formosa, Japan and the Philippines, are biologically distinct. They have investigated the virulence of these 4 strains in laboratory animals. In preliminary experiments with the Formosan strain 4 groups of 36 mice were exposed to 12, 24, 50 and 100 cercariae: the survival times in days after infection were 101·00±72·73, 60·83±9·49, 53·56±9·07, 50·22±5·91, and after eggs were found in the stools, 56·43±72·13, 17·69±8·57, 10·86±8·05, 8·19±4·59.

The virulence of the 4 strains was investigated by exposing groups of 36 mice to 100 cercariae. The Chinese, Formosan, Japanese and Philippine strains resulted in survivals after infection of 47·89±3·72, 50·22±5·91, 38·78±1·63, 40·61±2·17, and 6·94±3·61, 8·19±4·59, 4·50±1·61, 5·17±1·99 days.

Intestinal haemorrhage in infected mice was not related to survival. They also conclude that, judging from the host survival times after inoculation and after the appearance of eggs in the faeces, the Japanese and Philippine strains of this schistosome species are more virulent than the Chinese and Formosan strains.

[For earlier studies by these workers, see this *Bulletin*, 1961, v. 58, 227, 228.]

W. E. Kershaw

Sadun, E. H.; Lin, S. S. **Studies on the Host Parasite Relationships to** *Schistosoma japonicum*. **IV. Resistance acquired by Infection, by Vaccination and by the Injection of Immune Serum, in Monkeys, Rabbits and Mice** [Sadun & Lin]. *J. Parasitology*. 1959, Oct., v. 45, No. 5, 543–8. [18 refs.] **V. Reactions in the Skin, Lungs and Liver of Normal and Immune Animals following Infection with** *Schistosoma japonicum* [Lin & Sadun]. *Ibid.*, 549–59, 12 figs. on 3 pls. [18 refs.]

IV. Monkeys, rabbits and mice develop an acquired resistance to *Schistosoma japonicum* by repeated infection, resulting in a reduction in the number and size of the developing worms, but no difference in the sex ratio.

Worm extracts and worm metabolites also produced resistance, as did injections of immune sera. But the resistance was less than that produced by previous experimental infection. Results support the belief that acquired immunity to *S. japonicum* is in part, at least, serological.

V. The skin, lungs and liver of monkeys, rabbits and mice after infection with *S. japonicum* showed a mild diffuse cellular reaction on first infection but in animals which had been infected at least 2 months earlier an intense cellular reaction occurred a few hours after penetration with cercariae in the skin and the migration of the schistosomulae was slowed down. Some were trapped in the skin, others reached the lungs, but were surrounded by diffuse nodules in which they remained alive for a long time. Those which were found later in the liver were stunted and sexually immature.

Both cellular and humoral responses are involved in immunity to *S. japonicum* infections.

[For earlier parts, see this *Bulletin*, 1959, v. 56, 463.]

W. E. Kershaw

Gofman-Kadoshnikov, P. B., Chizhova, T. P., Bazazyan, A. G. & Kravtsov, E. G. **[Diphyllobothriasis Incidence in the Moscow Region]** *Med. Parasit. & Parasitic Dis.* Moscow. 1961, v. 30, No. 1, 92–5, 125, 1 map. [In Russian.]

The English summary appended to the paper is as follows:—

"For the first time there has been established that the fish in the Moscow canal are infested with plerocercoids of D. latum. The perch was infested in 3·6%, the ruff—in 9·4% and the pike—in 44%.

"The analysis of the morbidity among the residents of the Moscow region helped to ascertain the focal spread of diphyllobothriasis. The main focus (covering 84·5% of the cases) embraces districts surrounding three, connected with each other, water basins: 1) the Moscow canal, 2) middle reaches of the Moscow river and 3) the Kliyazma river. There are also individual small foci in the north-eastern part of the region (Istra) and in the West (Shatura).

"The paper brings out some heretofore unknown epidemiological factors causing the focal distribution of the disease and points to the relationship between the formation of the foci and ecological conditions underlying it."

Markkanen, T. K., Kalliomäki, J. L., Oka, M. & Vanha-Perttula, T. **The Ascorbic Acid Content of Blood and Urine. A Study of Anemic and Non-Anemic Carriers of Fish Tapeworm.** *Ann. Med. Intern. Fenniae.* Helsinki. 1960, v. 49, No. 4, 263–8.

"The ascorbic acid content of whole blood in the control series was 1·06 ± 0·10 mg.%, and in 16 tapeworm carriers 0·53 ± 0·05 mg.%.

"The urinary excretion of ascorbic acid in the anemic tapeworm-carrier-group was 11·65 ± 1·23 mg., in the non-anemic group 16·40 ± 1·84 mg., in the whole tapeworm-carrier-group 15·52 ± 1·48 mg., and in the controls series 24·45 ± 1·74 mg. 24 hrs."

Sokolova, L. N. & Yaroshchuk, I. N. **[A Case of Human Sparganosis in the U.S.S.R.]** *Med. Parasit. & Parasitic Dis.* Moscow. 1961, v. 30, No. 1, 106–7. [In Russian.]

Bruijning, C. F. A. & De Jongh, R T. **A Case of Human Sparganosis in Liberia.** *Trop. & Geograph. Med.* Amsterdam. 1960, Dec., v. 12, No. 4, 356–8, 2 figs. [10 refs.]

See this *Bulletin*, 1960, v. 57, 824.

Guilhon, J., Graber, M. & Geller, A. Essais de traitement du téniasis humain par le 5,5′-dichloro-2,2′-dihydroxydiphénylméthane. **[Trial of Treatment of Human Taeniasis with 5,5′-dichloro-2,2′-dihydroxydiphenylmethane]** *Bull. Soc. Path. Exot.* 1960, July–Aug., v. 53, No. 4, 697–703. [13 refs.]

Seeking an effective taenicide to control the very common human infections with *Taenia saginata* in Equatorial Africa (where infections with *T. solium* are rare) the authors tried this drug, other names for which are G4, Dicestal, Diphenthane, Dichlorophen, Taeniathane, Taeniatol and Antiphene. Literature is quoted on the use of the drug.

The present authors treated 79 patients at Tchad. Of these 55 were adults, 4 were children and 20 were adults previously unsuccessfully treated with various drugs. After a light meal the previous evening, the patients fasted till next morning, when they treated themselves with 4·5 gm. of the drug, purified to 98% and taken in water, tea or coffee. One hour later they took 10 gm. of sodium sulphate in water and rested till 1 p.m., when they resumed normal activity, taking light broth while awaiting the evening meal. The effects of the drug were followed for 3 to 8 months, stool examinations being done during the first, second and third months after treatment.

A single dose apparently cured all but 3 of the patients (95·2%) and all of the 20 previously unsuccessfully treated. The results in Africans and Europeans were the same.

A table shows the 40 to 100% cures obtained by other authors quoted. Discussing these, the present authors note the following points.

1. The patients were not always prepared for the treatment and the results obtained were for this reason not so definite. The present authors' experience of the treatment of domesticated animals shows that dieting [presumably fasting] for 24 hours at least before treatment is necessary, if not indispensable, and two of their failures seemed to have been due to insufficient preparation of patients who did not obey the instructions given.

2. Most of the authors quoted gave tablets containing 0·5 gm. The present authors had only the powder, which may stick to the glass from which it is taken, so that the whole dose may not be taken and its odour may be disagreeable to some patients; it can be masked with peppermint or other flavouring, but capsules give better results.

3. Several earlier authors did not advise purgation after treatment, thinking that the drug itself has enough action of this kind. The present authors think that 5 to 10 gm. of sodium sulphate is preferable and may avoid the allergic reactions to the drug sometimes seen. It also reduces the risk of cysticercosis derived from eggs of *T. solium* set free from disintegrating proglottids.

4. The dose given by earlier authors varied widely, as the figures taken from earlier papers show. The present authors adhered to a standard dose of 55 to 75 mgm./kgm. (4·5 gm. per person weighing 60 to 80 kgm.) and obtained with this only 2 failures among 55 patients. It is, however, best to have the exact weight of children and to give them a standard dose of 60 to 70 mgm./kgm. One adult given 3·5 gm./51 kgm. had proglottids 1 week after this dose, but a second dose of 4·2 gm. caused expulsion of the cestode. Otherwise, except in particular cases, it seems not necessary either to repeat or divide the doses. The important differences in the published results are probably explained by different methods of administration and by different degrees of purity of the drug. Thus JACKSON [this *Bulletin*, 1957, v. 54, 63] used purified G4 and obtained 100% of cures without dieting [fasting] and with smaller doses (3·5 gm.) than that used by the present authors. Toxicity of the drug is relatively low compared with that of other taenicides. Up to 250 mgm./kgm. have been given without serious results [*ibid.*, 1957, v. 54, 983], though these large doses

may cause headache and rapid pulse. The dose given by the present authors was usually well tolerated, but sometimes about 10% of the patients showed allergic effects (lassitude, colic, diarrhoea, nausea and vomiting). Children tolerate 75 mgm./kgm. well. The drug kills the cestode *in situ* and it is digested, or, more rarely, the whole worm is expelled. It can be especially recommended for enfeebled or convalescent subjects or adults whose work does not allow them the time for other treatments, but its chief value is for children, even when they are very young. The authors think it is a practical drug for campaigns for the eradication of taeniasis. *G. Lapage*

DONCKASTER, R., DONOSO, F., ATIAS, A., FAIGUENBAUM, J. & JARPO, A. Ensayo terapéutico de las teniasis con un derivado de la salicilamida. (Comunicación preliminar.) [**Therapeutic Trials on Taeniasis with a Salycilamide Derivative**] *Bol. Chileno de Parasit.* 1961, Jan.–Mar., v. 16, No. 1, 4–6. English summary (5 lines).

Yomesan is a cestocidal product also known as Bayer 2353 or N-(2′-chlor-4′-nitrophenyl)-5-chlorsalicylamide. It is a white, odourless powder, insoluble in water and dispensed in 0·5 gm. tablets. 77 out-patients in Chile with taeniasis (67 with *Taenia saginata*, 8 with *T. solium*, 1 with both and 1 unidentified) were treated with this drug. Those above 5 years of age were given 2 gm. and small children were given 1·5 gm.

This drug was well tolerated and only 12 patients showed slight symptoms attributable to it. 41 were cured of *Taenia* infection at the end of 4 months; in 15 others this period of follow-up has not yet been completed. At the same time concomitant *Hymenolepis nana* and *Enterobius vermicularis* were evacuated and it is proposed to investigate the action of the drug on these parasites still further.

The action of the drug was less than that obtained with acridines.

Philip Manson-Bahr

DUNCAN, M. **A Case of Hydatid Disease in Northern Nigeria.** *West African Med. J.* 1961, Feb., v. 10 (n.s.), No. 1, 63.

SMITH, E. Mary G. & HANSON, S. **Alveolar Echinococcosis. A Case Report with a Discussion of the Ecology of the Disease.** *Amer. J. Clin. Path.* 1961, Feb., v. 35, No 2, 160–65, 4 figs.

The patient, who had spent 8 years in southern Germany, was seen in Edmonton, Alberta. This is believed to be only the second case recorded in Canada.

KNIERIM, Feliza & NIEDMANN, G. La reacción de hemaglutinación aplicada al diagnóstico serológico de la hidatidosis. [**The Haemagglutination Test as applied to the Serological Diagnosis of Hydatid Disease**] *Bol. Chileno de Parasit.* 1961, Jan.–Mar., v. 16, No. 1, 6–9. [10 refs.]

The English summary appended to the paper is as follows:—

"Haemagglutination tests performed in 106 confirmed cases of hydatid disease yielded 85% positive cases against 61% obtained with the complement fixation test. Specificity of the haemagglutination test was counter-tested in 58 cases of parasitic diseases other than hydatid disease. A few false positive reactions were obtained in cases of cysticercosis, distomatosis and trichinosis. The study of sera from 119 patients with non-parasitic diseases (including 39 cases of neoplasia and 8 of liver cirrhosis) revealed negative results for the haemagglutination test, whereas the complement fixation test was positive in 4 cases of neoplasia."

[See this *Bulletin*, 1959, v. 56, 856 *bis*.]

POPPER, M. & LORIAN, V. Teste de eosinofilia induzida no diagnóstico da hidatidose pulmonar. [**Induced Eosinophilia in the Diagnosis of Pulmonary Hydatid Cyst**] *Rev. Inst. Med. Trop. São Paulo.* 1960, Sept.–Oct., v 2, No. 5, 272–5. English summary.

The authors, from the Institute of Tropical Medicine in São Paulo, Brazil, set out to determine whether the hypereosinophilia which followed the performance of the Casoni test might be of value in the diagnosis of hydatid disease. They carried out the test on 142 patients suspected of having pulmonary hydatidosis who were investigated surgically. 0·3 ml. of a bovine hydatid antigen was injected intradermally into the forearm and the test was read after 10 and 30 minutes and 24 hours. Before the Casoni test and thereafter daily for 7 days, they carried out blood counts, with special reference to the absolute eosinophilia. The results are tabulated. 124 (88%) of Casoni tests were positive, 89 in 10 minutes, 30 in 30 minutes and 5 in 24 hours. The positive results occurred in 70% of cases which were surgically confirmed and in only 18% of those which were not.

The eosinophilia reached its peak (an increase of 50% or more over the initial level) on the 4th day. This was taken as the criterion of a positive test and on this basis 109 (77%) were judged to be positive: 71% of these were in surgically confirmed and 6% in surgically unconfirmed cases.

Finally, the percentage of positive results in the Casoni and eosinophilia tests were compared. 64% were found to be positive by both tests, 60% in the surgically confirmed and 4% in the unconfirmed cases. The authors conclude that the induced eosinophilia test is a useful addition to the routine measures in the diagnosis of pulmonary hydatidosis.

[Some of the percentages shown in the tables are incorrect.]

H. J. O'D. Burke-Gaffney

POWERS, L. E. & CHURCHILL, C. W. **Bibliography of Echinococcosis with Selected Abstracts.**

This book was reviewed on p. 650.

Trans. Roy. Soc. Trop. Med. & Hyg. 1961, Jan., v. 55, No. 1, 17–29, 2 figs. [22 refs.] **Symposium on Hookworm Disease. I. The Problem of Ancylostomiasis in the Congo and Ruanda-Urundi** [Van Oye, E.], 17–19. **II. Hookworm Infection and Anaemia in Mauritius** [Stott, G.], 20–25. **III. The Relation of Hookworm Loads and Species to Intestinal Blood Loss and the Genesis of Iron Deficiency Anaemia** [Foy, H. & Kondi, Athena], 26–9. Discussion 30–35, with 3 further refs. [Woodruff, A. W.; Standen, O. D.; Selwyn-Clarke, S.; McRobert, G.; Macdonald, G.; Stott, G. (in reply); Foy, H. (in reply)].

I. The first paper describes in general terms the good results obtained by Belgian workers in the Congo who used bephenium hydroxynaphthoate (Alcopar) for hookworm disease. Its safety in mass treatment raised hopes that eradication of the disease need not await the more costly and lengthy health and social projects.

II. Dr. Stott's paper begins with the notable sentence: "Following the almost complete eradication of malaria from Mauritius there was no reduction in the incidence of anaemia, which then became the major public health problem". His survey of the island showed that where climatic conditions determined a high incidence of hookworm infection, there the anaemia was most severe. The anaemia was hypochromic in 95% of patients, often extremely severe, and iron alone was sufficient to give a good response. The highest number of worms recovered after an anthelmintic was 944, and the average 84; there was no correlation between the hookworm load and the degree of anaemia. Since the national diet was estimated to supply only 10·2 mgm. of iron per head per day (and in one survey it was only 6·3 mgm.), the interpretation given was that such a marginal iron intake was readily thrown into "negative balance" by hookworms. In this paper it is suggested that enrichment of the diet with iron would be the most effective public health measure against anaemia in Mauritius.

III. The third paper puts forward a general explanation of the relation of hookworms to anaemia, and follows the line of the authors' previous publications [this *Bulletin*, 1959, v. 56, 638; 1961, v. 58, 233]. Its main points, the time relations between infection and iron depletion, were put in concrete terms by Professor A. W. Woodruff in the Discussion: "Depot stores of iron commonly amount to at least 1 g. in healthy adults and if one supposed, for example, that they were normal when a hookworm infection was acquired and that as a result of the infection a negative iron balance of 1 mg. per day was established, then it would take nearly 3 years for these depots to become depleted, yet before they had become depleted it would be possible for a heavy hookworm infection to be present without any coincident anaemia". Other speakers noted the difference between the Belgian and the Mauritian approach to the community problem. All were agreed on the need for an attack on all possible fronts, but the emphasis varied, as indeed social and dietary conditions vary in the tropics. It would clearly be useless to rely on fortification with iron of a diet already containing enough available iron, just as nothing but iron would suffice when supplies are marginal. With this in view Dr. Foy urged the need for topical surveys of tropical diets by modern methods to establish how much iron is in fact available in each case. *Alan B. Raper*

TASKER, P. W. G. **Blood Loss from Hookworm Infection.** *Trans. Roy. Soc. Trop. Med. & Hyg.* 1961, Jan., v. 55, No. 1, 36–9, 2 figs [15 refs.]

This paper from Malaya deals with studies by means of ^{51}Cr-tagged red cells in 29 patients with *Necator americanus* infection. Over 10 to 15 days, the daily blood loss was calculated from measurements of the radioactivity of the stools daily, and of the blood every 3 or 4 days. Then, after a vermifuge, worms were counted in the excreta of the next 2 days, while the measurement of any residual blood loss continued. Then a second vermifuge was given, and any residual blood loss was deducted from the daily readings of the test period in order to assess the loss due to worms actually recovered.

With few (20) worms the daily blood loss was about 2 ml., and with many worms (1,500 and over) it was about 90 ml. The loss was about 0·1 ml. per worm per day when the load was light, but only 0·03 ml. per worm per day when it was heavy. These estimates are thought to be about 15% too low, as the author had separately determined that about 15% of the ^{51}Cr might be re-absorbed from the gut.

At normal Hb levels, a load of 100 worms would cause the loss of about 4 mgm. of iron a day, which on a marginal intake could result in a negative iron balance. As the Hb dropped, iron loss would decrease until a balance was struck. But a heavy infection could deplete the iron stores even of a person taking a diet rich in iron. These considerations justify the author's initial statement that hookworm anaemia results from an excessive loss of iron due to the infection, *which is not balanced by the intake* [this *Bulletin*, 1935, v. 32, 262.] *Alan B. Raper*

CAVIER, R. & BELLON, R. Traitement de l'ankylostomose par l'hydroxynaphtoate de béphénium. [**Treatment of Ankylostomiasis with Bephenium Hydroxynaphthoate**] *Bull. Soc. Path. Exot.* 1960, July–Aug., v. 53, No. 4, 623–6.

The authors refer to the literature on the discovery of the anthelmintic action of bephenium salts and the good results obtained with them in the treatment of ankylostomiasis of the dog, cat and man. A table shows results recorded in 4 of the papers quoted, the cures of *Necator* infections ranging from 62 to 88·4% [this *Bulletin*, 1960, v. 57, 924] and those of *Ancylostoma caninum* infections from 82·4 to 95·4% [*ibid.*, 1960, v. 57, 496 *bis*].

The present authors treated, in Guadeloupe, 69 patients, all infected with *Necator americanus*. Of these 65 were adults (35 men, 30 women) and 4 were children (2 boys aged 6, 2 girls aged 10). Each patient had two treatments. For each treatment 5 gm. (2·5 gm. of the base) of the hydroxynaphthoate were given (as Alcopar) after breakfast, irrespective of the age or weight and without a previous fast or a subsequent purge. There were no signs of intolerance. Stools were examined 2 weeks after the second dose or 5 weeks after the end of treatment.

The results were that the stools of 61 patients were negative and those of 8 patients clearly showed a reduction in the number of eggs [no figures are given]. Thus the percentage of apparent cures was 88·4%.

The authors conclude that bephenium hydroxynaphthoate is very effective,

well tolerated, easy to give and seems to be better than other drugs so far recommended. *G. Lapage*

CAMPOS, R., AMATO NETO, V., MEIRA, D. A., PIRES, C. D. de A., IGLESIAS, J. & DO NASCIMENTO, Ondina B., Jr. Observações relativas ao tratamento de trinta casos de ancilostomíase pelo hidroxinaftoato de befênio. **[Treatment of 30 Cases of Ankylostomiasis with Bephenium Hydroxynaphthoate]** *Rev. Inst. Med. Trop. São Paulo.* 1960, Sept.–Oct., v. 2, No. 5, 276–80. English summary.

The authors, in São Paulo, Brazil, treated 30 patients, mostly adults, suffering from ankylostomiasis with bephenium hydroxynaphthoate in a dosage of 5 gm. of the salt: 1 to 5 doses were given at weekly intervals. 14 were given flavoured tablets, 11 plain tablets and 5 a liquid preparation. Egg counts were made before and 5 days after treatment.

The results are tabulated. 24 patients were freed of their hookworms and the other 6 still showed up to 800 eggs per gm. of faeces. The drug was satisfactorily tolerated, although some patients experienced nausea, vomiting and diarrhoea. The flavoured tablets were best tolerated. The elimination of the infection was more rapid when the initial egg count was low.

H. J. O'D. Burke-Gaffney

YOUNG, M. D., JEFFERY, G. M., MOREHOUSE, W. G., FREED, J. E. & JOHNSON, Ruth S. **The Comparative Efficacy of Bephenium Hydroxynaphthoate and Tetrachloroethylene against Hookworm and other Parasites of Man.** *Amer. J. Trop. Med. & Hyg.* 1960, Sept., v. 9, No. 5, 488–91.

This paper describes a carefully conducted therapeutic investigation into the relative efficiency of these two anthelmintics against *Necator americanus*: it was carried out on a large group of female patients in a mental hospital in South Carolina, U.S.A. Bephenium hydroxynaphthoate, in the granular proprietary form Alcopar (Burroughs Wellcome) was administered to a total of 168 patients in 13 different dosage schedules, ranging from a single dose of 2·5 gm. of the base, to a maximum of 5 gm. daily for 5 days. While a single dose of 5 gm. caused a 71% reduction in egg output only 3 out of 21 patients were cleared of their worms. However, when 5 gm. were given daily for 3–5 days, egg excretion fell by 95–98% and 26 out of 49 patients were cured. Side effects were rare, occurring in only 12 patients (7%); they comprised vomiting in 9, diarrhoea in 2 and nausea in 1. Treatment had to be terminated in only a single instance. This series of patients had high initial egg loads of 1,000 to more than 2,000 per gm. of faeces. For comparison, a group of 39 patients with low egg loads of 50 to 1,000 per gm. were treated similarly with statistically comparable results.

Tetrachlorethylene was given by 3 different schedules, 3 ml. without or with a subsequent purge and 4 ml. without subsequent purgation. The first gave a 58% reduction of egg excretion, the second and third reductions of 49% and 51% respectively. The infection was eliminated in only 1 out of 36 patients treated with this drug, and she was among the 22 who received 4 ml. There were, however, no side effects.

In infections with *N. americanus* the authors support in general the findings of Goodwin and his colleagues [this *Bulletin*, 1959, v. 56, 639] who also compared bephenium hydroxynaphthoate with tetrachlorethylene.

Many patients also carried *Ascaris lumbricoides* and *Trichuris trichiura*, and the effect of bephenium on these was also assessed. Elimination of *Ascaris* was obtained in 12 out of 13 patients even by a single dose of 5 gm., and this achieved a 99% reduction in the egg excretion of the single remaining patient. In the patients suffering from trichuriasis, most of whom showed heavy egg loads, in many cases exceeding 10,000 per gm. of faeces, complete clearance was obtained in 14 out of 69 by a 3- to 5-day treatment schedule, and in the remainder a substantial reduction in egg excretion was achieved.

[The superiority of bephenium hydroxynaphthoate over tetrachlorethylene, both in efficiency and ease of administration, in infections with *N. americanus* is again demonstrated.] *J. H. Walters*

Noleto, P. A. & Ferreira, C. S. Estrongiloidose. Considerações a propósito de dois casos fatais. [**Observations on Two Fatal Cases of Strongyloidosis**] *Rev. Brasileira Med.* Rio de Janeiro. 1960, Apr., v. 17, No. 4, 325–9, 6 figs. [15 refs.] English summary.

Corrêa, M. O. A. Estudo da ação terapêutica da ditiazanina na estrongiloidose e na tricocefalose humana. [**A Study on the Therapeutic Action of Dithiazanine in Human *Strongyloides* and *Trichuris* Infections**] *Rev. Inst. Adolfo Lutz.* São Paulo. 1958, v. 18, 123–31. [13 refs.] English summary.

The author points out that the incidence of *Strongyloides stercoralis* infections as shown by the modified Baermann method varied in different parts of São Paulo State from 0·28% to as much as 17·49% in over 100,000 specimens examined, and its extension with the clinical symptoms associated with it is important. As for *Trichuris*, out of 55,764 specimens from schoolchildren in the city of São Paulo, examined by the Willis method, 42·83% were found positive and 40·21% positive for *Ascaris* [this *Bulletin*, 1955, v. 52, 789].

The effect of dithiazanine was then tried on these two infections in two schemes of treatment, the dosage in the second being half that in the first as follows: in the first scheme the dosage was 200 mgm. taken 3 times a day 2 hours after the main meals, for 7 days; in the second scheme the dose was 100 mgm. 3 times a day. Faeces were examined by Rugai's, Hoffman's and Willis's methods, tests for cure being made over a period varying from 5–48 days after the end of treatment, not less than 3 samples being examined in each.

The results were as follows:

	1st Scheme (18 patients)		2nd Scheme (19 patients)	
	Number Treated	Number Negative	Number Treated	Number Negative
Strongyloides	15	15	17	16
Trichuris	11	9	7	7
Ascaris	7	5	2	0
Necator	2	2	2	1
Hymenolepis	1	1	2	1

5 patients showed symptoms of intolerance but in neither scheme were symptoms severe enough to stop treatment.

The author considers that since the lower dosage gave practically the same results as double the dosage with less evidence of intolerance, it is the reasonable dose to give and that the results compare very favourably with those of other drugs. *W. K. Dunscombe*

STAM, A. B. Un cas mortel d'ascaridiose (*Ascaris lumbricoides* L.) chez le chimpanzé nain (*Pan paniscus* Schwarz). [**A Fatal Case of** *Ascaris lumbricoides* **Infection in a Dwarf Chimpanzee** (*Pan paniscus*)] *Ann. Parasit. Humaine et Comparée*. 1960, July–Sept., v. 35, No. 4, 675.

CABRERA, B. D., GARCIA, E. G., CRUZ, Trinita A. & JUECO, Nonette L. **Treatment of Ascariasis with Piperazine.** *J. Philippine Med. Ass.* 1960, Dec. v. 36, No. 12, 904–8.

In the Philippines the authors treated children infected with *Ascaris lumbricoides* with piperazine [the salt used is not stated]. They used a 10% preparation and a 10% preparation with "adjuvant" in a dosage of 65–75 mgm./kgm. per day, and a 20% preparation in a dosage of 125–150 mgm./kgm. per day given as a single daily dose. No purgation was used. Test of cure was freedom from ova in stool samples on two different days 5–7 days after cessation of treatment.

They found that results progressively improved with 1, 2 and 4 days of treatment, and were also better with the heavier dosage. A single day's treatment gave 34% and 62% cures with the lighter and heavier dosage of the plain drug, 2 days' 49% and 78%, 4 days' 89% and 93%. The authors suggest that the relative failure of single-dose treatment in the Philippines compared with the results claimed elsewhere may be due to a bulky, high roughage diet diluting the drug.

Out of 666 children treated only 2 experienced any side reaction; one had nausea and vomiting, and one nausea and headache. *A. C. E. Cole*

See also p. 747, SCHACHER & DANARAJ, **Intestinal Helminths in relation to Eosinophilic Lung (Tropical Eosinophilia) in Singapore.**

DAVIES, A. M. **Filariasis in Indian Jews in Israel. A Five-Year Follow-Up.** *Trans. Roy. Soc. Trop. Med. & Hyg.* 1961, Jan., v. 55, No. 1, 52–5. [19 refs.]

Between 1953 and 1956 some 2,000 immigrants came to Israel from Cochin, India, where filariasis is endemic. A survey of prospective immigrants made in India in 1954 had revealed 13·5% with clinical signs of filariasis [this *Bulletin*, 1955, v. 52, 1111] and arrangements were made to treat them with diethylcarbamazine after arrival in Israel. There were gaps, however, in these arrangements, and a microfilaria survey in Israel in 1955–56 showed that 11·6% of the immigrants examined were harbouring the microfilariae of *Wuchereria bancrofti*. A few *Culex molestus* were also found to be naturally infected, and experiments confirmed that this mosquito was an efficient experimental vector

[*ibid.*, 1956, v. 53, 1458, and 1957, v. 54, 848]. Efforts to trace all immigrants were subsequently intensified, and they were given two or three courses of diethylcarbamazine, 2 mgm./kgm. 3 times a day for a fortnight, under close supervision. Future immigrants were to receive a fortnight's course of diethylcarbamazine before leaving India.

During 1958–59, Indian Jews in Israel were visited in their homes between 9 p.m. and 1 a.m. and thick blood films were collected. Only 2 microfilaria carriers, both with light infections, were found among 1,153 persons examined. One, a woman of 29 years, had been in Israel 4 years and had escaped treatment; details of the other are not available. There was no indication that filariasis transmission had occurred in Israel.

The author suggests that conditions in many parts of Israel may be unfavourable for the transmission of filariasis. Nevertheless, the mass treatment was desirable, and there is every chance that the infection will be eradicated in a year or two. *T. Wilson*

NAIR, C. P., ROY, R. & JOSEPH, C. **Filariasis in Kerala State. VI. Filaria Survey of Fort Cochin Municipality.** *Indian J. Malariology.* 1960, Sept., v. 14, No. 3, 223–31, 1 map & 1 graph.

This paper reports the findings of a filariasis survey in the Fort Cochin Municipality, Kerala State, India, with a total population of about 30,000.

Randomly selected houses were visited between 8.30 p.m. and 12.30 a.m., when blood films approximately 20 cmm. were collected from as many of the inhabitants as possible, and disease manifestations were noted. Mosquitoes caught between 7 a.m. and 9 a.m. were dissected and examined for filarial infection. Results are given in the text and in tables.

Out of 8,581 persons examined (4,087 males and 4,494 females), 931 were found to have microfilariae of *Wuchereria bancrofti* in their blood, 33 had microfilariae of *Wuchereria* [=*Brugia*] *malayi*, and 5 had both infections. The overall microfilaria rate was 11·3% and the disease rate was 6·1%; in calculating the latter, only persons with detectable clinical lesions were included. The average microfilaria count per positive film was 20·2.

Most microfilaria carriers were symptomless, and persons without filarial disease had a microfilaria rate of 11·9%, whereas those with filarial disease had a microfilaria rate of 2·1%. Microfilariae of *W. bancrofti* were found in 2 children aged about 3 years, and a boy of 5 years had swelling of one leg and a history of attacks of filarial fever.

Culex pipiens fatigans was the most prevalent mosquito and was the only species found infected, with a total infection rate of 13·7% and an infective larva rate of 3·4% in 348 dissected. Breeding places were numerous, being mostly cesspits, drains and ditches.

These results are compared with those of previous surveys [*e.g.*, this *Bulletin*, 1957, v. 54, 462]; the incidence of filariasis has remained high for more than 40 years, but there seems to have been a relative increase in the proportion of *W. bancrofti* and decrease in *B. malayi*, probably owing to a progressive change from rural to urban conditions.

[The data recorded would have been more valuable had the figures for males and females been given separately, together with some indication of mosquito collecting methods.] *T. Wilson*

NAIR, C. P. **Filariasis in Centrally Administered Areas. Part I. Filaria Survey of Pondicherry Settlement.** *Indian J. Malariology.* 1960, Sept., v. 14, No. 3, 233–52, 2 maps and 1 graph.

This paper records the findings of a filariasis survey carried out in March 1957 in Pondicherry Settlement, one of four Settlements comprising the State of Pondicherry, which was transferred from French to Indian rule in 1955. The Settlement contains an urban population of about 60,000, and a rural population of 150,000.

House-to-house visits were made in randomly selected parts of the Settlement between 8 p.m. and 1 a.m. and all the inmates of the houses were examined. Blood films of approximately 20 cmm. were collected and clinical lesions were recorded. Adult mosquitoes were collected in the morning and at night from houses and cattle-sheds, and breeding places were sought. Blood smears were also collected from domestic animals during the day. The results are presented in 15 tables, data for males and females being given separately.

Wuchereria bancrofti was the only species of filaria found. No area was free from infection, but the microfilaria rate, and, with few exceptions, the average microfilaria count per positive film, was lower in the rural areas than in the town for both sexes. No infections were found in 15 infants examined, and the youngest infected child was 2 years old. For both males and females there was a progressive rise in microfilaria rate to peaks of 7·8 and 7·9% respectively in the 11–20 year age-group, after which only minor fluctuations occurred. The mean microfilaria count followed much the same pattern with peaks of 25·7 and 24·7 in the 11–20 year age-group.

Disease manifestations are also given in detail for both sexes. The youngest affected child was 4 years old, and the incidence rose steadily with age. A higher overall incidence in males was largely due to hydrocele, and males in the town had a lower disease rate than those in an adjacent rural area.

14 species of mosquitoes were collected but infection was found only in *Culex fatigans*, which had a filarial infection rate of 8·96% and an infective larva rate of 1·4% in 435 dissected from all areas. Breeding places were stagnant drains, badly constructed septic tanks, sullage drains and soakage pits.

Out of 158 animals examined, one bull was found to be harbouring microfilariae. [The species is not mentioned.]

[This paper contains a mass of information which cannot be readily abstracted.] *T. Wilson*

FAN, P. C.; HSU, J.; CHANG, T. L.; LIU, J. C. **Filariasis in Free China. Part 4. Incidence in Kinmen Chinese** [FAN & HSU]. Reprinted from *Chinese Med. J.* Taipei. 1957, June, v. 4, No. 2, 81–95, 2 maps [12 refs.] **Part 5. Incidence in Native Chinese of Matsu Archipelago** [FAN & HSU]. *Ibid.*, Sept., No 3, 137–45, 1 map. **Part 6. Incidence of Filariasis among Tachen Evacuees in Northeast Taiwan** [FAN, HSU, CHANG & LIU]. *Ibid.*, Dec., No. 4, 188–99, 2 maps. [15 refs.]

i. This paper reports in detail the results of a filariasis survey carried out in 1952 on the Kinmen (Quemoy) Islands, which lie a few miles from the coast of Fukien Province of mainland China, where filariasis is common. A summary of these results has already been published [this *Bulletin*, 1957, v. 54, 66].

The total population of about 42,000 at the time of the survey was divided between the two islands of Kinmen Proper and Little Kinmen. The people live in isolated villages, and 7 of these were surveyed out of a total of 148. There was a shortage of able-bodied men owing to emigration, most of those examined being women, old men and children. Blood films of 20 cmm. were collected between 10 p.m. and 1 a.m. Mosquito surveys were not made, but the species likely to occur were assumed to be those known from nearby Amoy. Meteorological conditions favour mosquito breeding throughout most of the year. The results are given in 11 tables and in the text.

All infections were identified as *Wucherèria bancrofti*, and the overall infection rate was 19·11% (272 out of 1,423). The rate was higher for Kinmen (20·47%) than for Little Kinmen (13·08%). There was little difference between males and females up to the age of 30 years, but older males tended to have the highest infection rates. When infections were analysed by families, it was found that 77% of 214 infected families had only one member infected, 19% had 2 members infected, and 4% had 3.

The microfilaria count per 20 cmm. was 10 or less in 43% of the microfilaria carriers, between 11 and 100 in 36% and over 100 in 21%. Enquiries into the movements of infected persons showed that 83% had never been abroad and must have acquired their infection locally.

The infection rate in the Kinmen islands is higher than that found in Taiwan Chinese (1·5%) or in Chinese in the Penghu (Pescadores) Archipelago (14%) [see above reference and *ibid.*, 1957, v. 54, 1443].

ii. A survey similar to the above was carried out in 1953–54 in 3 islands of the Matsu Archipelago further to the north and further from the mainland. The total population of this group was 10,358; an infection rate of 11·62% was found (71 out of 611), all being *Wuchereria bancrofti*. There was considerable variation in rate from village to village. In almost every instance, females had higher infection rates than males, overall rates being 15% and 10% respectively; the authors attribute this to the fact that most males are fishermen who are away from home much of their time and are therefore less exposed to mosquito bites. Over 90% of infected families had only one member infected; the microfilaria count per 20 cmm. blood was 10 or less in 44% of the microfilaria carriers, between 11 and 100 in 34% and over 100 in 22%.

iii. The population of the Ta-Chen islands (about 18,000 persons) was removed to Taiwan in 1955. Blood films were collected soon afterwards from 5,335 such evacuees, housed at that time in scattered camps in the north-east of Taiwan. 360 were found with microfilariae (an infection rate of 6·75%), and 347 of these were identified as *Wuchereria* [now *Brugia*] *malayi*, only 13 being *W. bancrofti*. Except for children under 10 years, the infection rate was higher in males than in females at all ages, the overall rates being 7·61% (217 out of 2,851) and 5·7% (143 out of 2,484) respectively. A girl of 14 months was found infected with *B. malayi*.

In discussion, the authors compare their findings with those of Wu and Huang [*ibid.*, 1956, v. 53, 631] who surveyed other groups of Ta-Chen islanders settled in camps elsewhere in Taiwan. The findings are very similar. In all, 14,183 evacuees have now been examined (or almost three-quarters of the total) and 8·4% of them were found infected, the bulk of the infections being *B. malayi*. This parasite has not been found in Taiwan Chinese or in the Chinese inhabitants of the other off-shore islands [see i and ii above], and there is a distinct

risk of it becoming established on Taiwan as a result of this influx of infected persons.

[These articles contain much interesting information, but do not mention the incidence of clinical filariasis in the populations examined, or give any indication of probable vectors.] *T. Wilson*

WU, Yao-Tsing & CHEN, Cheng-Teh. **Filariasis Endemic Areas in the Taiwan Proper. Part I. Incidence of Bancroftian Microfilarial Infection among the Native People in Southern Taiwan.** *J. Formosan Med. Ass.* 1960, Apr. 28, v. 59, No. 4, 262–71, 1 map. [18 refs.]

Endemic foci of filariasis were discovered in southern Taiwan [Formosa] only after World War II. Although infection rates were low [this *Bulletin*, 1957, v. 54, 66, and 1958, v. 55, 291], the influx of microfilaria carriers from the Pescadores and other islands, and the presence of *Culex fatigans* on Taiwan, made a control programme desirable. The present paper reports the results of surveys made between October 1958 and June 1959 by members of the Taiwan Provincial Malaria Research Institute as a preliminary to control.

Mass blood surveys covering about 80% of the population were made in the previously surveyed villages and in some others nearby, and sampling surveys in other representative rural and urban areas, which are shown on a map. Thick blood smears, of about 1·5 cm. diameter, were collected between 9 p.m. and 2 a.m. during house-to-house visits, infants of less than 12 months being excluded. Mosquitoes were collected in one area and dissected next day. Results are presented in tables and discussed in the text.

Wuchereria bancrofti was the only species of filaria found. The microfilaria rate in the mass surveys was 1·9% in 17,430 persons examined, the highest rate in any one locality being 5·29%. In the sampling surveys, the microfilaria rate in 40,212 persons was 0·9%, the highest rate for one locality being 5·85%. Mosquito dissections in a village where the population had a microfilaria rate of 5·76% revealed filarial larvae in 5 out of 95 *Culex fatigans* (2 with Stage III larvae) and in 1 out of 31 *C. vishnui* (Stage I larvae only). The infected mosquitoes all came from houses containing microfilaria carriers.

The absence of infection with *Brugia malayi* is interesting, as a considerable number of Ta-Chen islanders infected with this species had been re-settled in Taiwan in 1955 [see above].

[This paper seems to be the first of a series. It is to be hoped that something will be said later about the incidence of clinical filariasis in populations with such low microfilaria rates.] *T. Wilson*

SOUTH PACIFIC COMMISSION. Noumea, New Caledonia. **Summary Data on Filariasis in the South Pacific** [IYENGAR, M. O. T.]. *Technical Paper No. 132.* 1960, Aug., v + 92 mimeographed pp., 2 maps (1 folding). [Numerous refs.] [2s.]

The summary data which appeared in South Pacific Commission Technical Paper No. 66 [this *Bulletin*, 1955, v. 52, 468] have been extended to include references to work published up to 1960. As before, the material is presented

in 4 sections—incidence of microfilarial infection, incidence of elephantiasis, observations on microfilarial periodicity and *Wuchereria bancrofti* infection in mosquitoes—supplemented by a list of references. An index to territories has been added, but the 4 coloured maps in the previous paper have been replaced by a single plain folding map of the region.

This publication, at a ridiculously low price, is to be welcomed as yet another example of the constant endeavour of the Commission, through the efforts of Dr. Iyengar, to provide up-to-date references to filariasis in the vast South Pacific area. *A. H. Phipps*

TAYLOR, Angela E. R. **Studies on the Microfilariae of *Loa loa, Wuchereria bancrofti, Brugia malayi, Dirofilaria immitis, D. repens* and *D. aethiops*.** *J. Helminthology*. 1960, v. 34, Nos. 1/2, 13–26, 7 text figs. & 20 figs. on 2 pls. [20 refs.]

Microfilariae of *Loa loa, Wuchereria bancrofti, Brugia malayi, Dirofilaria immitis, D. repens* and *D. aethiops,* were studied in detail by means of phase-contrast and ultra-violet microscopy and vital staining techniques. Classical anatomical features are described but the new methods demonstrated hitherto unrecorded structures. The nerve ring consists of two adjacent cells. Just behind the hook are a pair of large cells which had previously been assumed to have been secretory—the *roten Mundegebilde* described by FÜLLEBORN. On phase contrast microscopy the movements of these two cells have been shown to be associated with the protrusion and retraction of the hook, and therefore have been named "hook-muscle cells". *W. E. Kershaw*

GHOSH, H. K. **Viability of *Mf. bancrofti* in Filarial Hydroceles: Preliminary Observations.** *J. Trop. Med. & Hyg.* 1961, Feb., v. 64, No. 2, 50.

"The viability of *Mf. bancrofti* [microfilariae of *Wuchereria bancrofti*] was tested in infected hydrocele fluid, infected venous blood and infected hydrocele fluid mixed with normal venous blood. No significant differences were detected in the survival periods of the larvae in these preparations."

MCGREGOR, I. A. & GILLES, H. M. **Further Studies on the Control of Bancroftian Filariasis in West Africa by means of Diethylcarbamazine.** *Ann. Trop. Med. & Parasit.* 1960, Dec., v. 54, No. 4, 415–18, 2 figs.

In earlier trials, diethylcarbamazine had been found effective against the microfilariae of *Wuchereria bancrofti* in the Gambia, but a high incidence of side effects made it unpopular [this *Bulletin*, 1953, v. 50, 232; 1956, v. 53, 638]. The present paper reports the results of further trials with the use of half the previous dose.

Carriers of the microfilariae of *W. bancrofti* were selected in 2 villages 4 miles apart. One village, Keneba, had been the site of the earlier trial and was also being sprayed annually with dieldrin; the other, Jali, had not been treated previously, and was considered typical of the region. Blood films of 50 cmm.

were collected between 9 p.m. and midnight from each group of carriers before treatment and at intervals thereafter. Doses of 2·5 mgm. diethylcarbamazine base per kgm. body weight were given under supervision on each of 5 successive days and enquiries were made about subsequent side effects.

The effect of this one course of treatment on microfilaraemia was broadly similar in each group. There was a rapid fall in microfilaria density, which persisted throughout the 43 months' period of observation, and tended to become more marked as time passed. The proportion still showing microfilariae in blood films also decreased steadily. At the last examination, 11% of 54 persons in Keneba still had microfilariae and the microfilaria load had been reduced by 98%; 27% of 33 persons in Jali still had microfilariae, and the microfilaria load had been reduced by 91%. In contrast with the earlier trials, very few persons complained of side effects attributable to treatment.

The authors suggest that the somewhat better results at Keneba may indicate a reduced risk of re-infection there, but consider the Jali results reasonably satisfactory. The lower dose used was just as effective as the higher one of the earlier trials, and was much more acceptable to the population concerned. [2·5 mgm. diethylcarbamazine base is equivalent to about 5 mgm. diethylcarbamazine citrate. The dose used in this recent trial is therefore much more in line with that being used in other countries—commonly 4–6 mgm. diethylcarbamazine citrate per kgm. body weight—than was the earlier dose.]

T. Wilson

LAURENCE, B. R. **The Biology of Two Species of Mosquito *Mansonia africana* (Theobald) and *Mansonia uniformis* (Theobald), belonging to the Subgenus *Mansonioides* (Diptera, Culicidae).** *Bull. Entom. Res.* 1960, Nov., v. 51, Pt. 3, 491–517, 9 figs. [Numerous refs.]

This paper is based on observations and experiments with laboratory colonies in London, supplemented by the author's field experience in Africa [this *Bulletin*, 1960, v. 57, 658], and a review of the literature.

Mansonia africana and *uniformis* are very similar in appearance and biology, though they can be distinguished by small differences in the larvae and pupae which are described, as well as by the adult differences. They occur together in Africa to which *M. africana* is confined; *M. uniformis* has a much wider range from Africa to China. They do not interbreed, though some copulation occurs if they are put together in the laboratory. Strains of *M. uniformis* from Africa, Ceylon and Malaya will interbreed, but some of the eggs are infertile, especially in crosses between African and Asian strains. Both species mate readily in small cages, and take the first blood meal when about 24 hours old. Eggs are laid 3–5 days after the blood meal, and the mosquitoes immediately refeed. *M. uniformis* is more active and difficult to catch immediately after a blood meal than is *M. africana*. The movements of the females leading up to and during egg laying are described. In experiments, *M. uniformis* laid more egg masses (and *M. africana* about the same number) on a dark background than on a light one. Both species laid more egg masses on plants in clean water than in polluted water, but *M. africana* was more sensitive to pollution than *M. uniformis*. Females of *M. uniformis* were slightly longer lived (up to 40 days) than *africana* (30 days); neither species can resist low humidities.

The biology of the early stages of both species is almost identical, though *M. uniformis* develops a little more quickly, especially in the egg, and larvae are more resistant to high temperatures. Larvae of both species will attach to any plant or other surface containing air, into which they can force their siphons, provided that food (bacteria, yeasts, etc.) is present. At 27–29°C. eggs of *M. uniformis* hatched in 5–6 days, those of *M. africana* in 6–7 days; the time from hatching to emergence of the first adult averaged 24·3 days for *M. uniformis* and 25·5 for *M. africana*. At 25–30°C. the pupal period for both species was 3–4 days; pupae detach themselves from their anchorage after about 3 days and float at the surface until emergence; once detached they cannot re-attach. It is thought that *M. africana* has evolved in Africa and that *uniformis* is probably a more recent invader.

[Anyone interested in the biology of *Mansonioides* mosquitoes should read this paper in the original.] *J. A. Reid*

BURTON, G. J. **Studies on the Bionomics of Mosquito Vectors which Transmit Filariasis in India. V. Further Studies on Attachment of *Mansonia annulifera* Larvae to Host Plants occurring in Tanks containing *Pistia stratiotes* in Kerala State, South India.** *Indian J. Malariology*. 1960, Sept., v. 14, No. 3, 191–218, 61 figs. on 19 pls.

"The attachment behaviour of *Mansonia annulifera* (Theobald) larvae to an additional fourteen species of plants occurring in *Pistia stratiotes* tanks or ponds in Kerala State, South India, was studied. The larvae were seen to attach to roots, stems, and leaves of *Limnophila racemosa* and *Asteracantha longifolia*; to roots and leaves of *Isachne dispar, Ilysanthes rotundifolia, Ceratopteris thalictroides*, and *Alternanthera triandra*; to roots and stems of *Limnanthemum cristatum*; to leaves and stems of *Elodea* (*Anacharis*) *canadensis*; to stems alone of *Hydrilla verticillata* and *Nitella furcata*; and to roots alone of *Cyperus haspan, Cyperus compressus, Monochoria vaginalis* and *Limnophila roxburghii*. The greatest amount of leaf attachment took place in *Isachne dispar*, gaseous exchange being possible in the absence of air chambers because of the loosely-packed tissue containing oxygen. The attachment to leaves in 7 of the 14 species studied once more substantiates the author's contentions that leaf attachments represent normal and not unusual behaviour, as an alternative method of effecting gaseous exchange. Nineteen plates containing 61 photographs by the author illustrate the plants studied and their attachment behaviour."

[See also this *Bulletin*, 1961, v. 58, 349.]

BATISTA, D., OLIVEIRA, W. R. & RABELLO, Virginia D. Estudo da patogenicidade da *Mansonella ozzardi* e da sintomatologia da mansonelose. [**A Study on the Pathogenicity of *Mansonella ozzardi* and on the Symptoms of Mansonellosis**] *Rev. Inst. Med. Trop. São Paulo*. 1960, Sept.–Oct., v. 2, No. 5, 281–9. [21 refs.] English summary.

Mansonella ozzardi is known to occur in Amazonia especially to the north of the city of Manaus (nearly 1,000 miles up the Amazon) and particularly in

the Solimões river basin [this *Bulletin*, 1958, v. 55, 1259]. The authors therefore selected a town, Codajás, on the left bank of that river for an investigation into the incidence of human infection and the symptomatology of the parasite.

1,014 persons of all ages from 3 years to over 60 were examined clinically and by thick blood films, while from those negative on direct examination blood was taken for concentration by Knott's method. It was found that of 342 males and 401 females studied, 113 and 112 respectively were positive by thick drop and a further 91 and 105 respectively by Knott's method, the total percentage positive being 56·7. The principal symptoms were pains in the joints especially the knees and ankles, and numbness of the legs, and the principal signs were erythematous-pruriginous patches, and inguino-crural adenitis. All these were considered to be due to the parasite. Eosinophilia was most marked in the blood films.

The authors point out that symptoms were most pronounced in patients with a high degree of microfilaraemia but symptoms were not found in pre-school-children and only rarely in schoolchildren and adolescents; they were most frequent in older adults. The authors consider that *M. ozzardi* causes a benign disease with a slow evolution and a favourable prognosis. The pathogenesis can be explained by local irritation produced by adult filariae either alive or dead, and by allergy as in other filariases. *W. K. Dunscombe*

SYMES, C. B. **A Note on *Dirofilaria immitis* and its Vectors in Fiji.** *J. Helminthology*. 1960, v. 34, Nos. 1/2, 39–42, 6 figs.

In investigations on human filariasis and its vectors in Fiji in 1954–56 [see this *Bulletin*, 1960, v. 57, 60] observations were made on the dog filaria to avoid the possibility of the developmental stages found in mosquitoes being confused with those of *Wuchereria bancrofti*.

Wild-caught *Aedes fijiensis*, *A. pseudoscutellaris* and *A. polynesiensis*, *Culex pipiens fatigans* and *C. annulirostris* contained 3rd stages of *Dirofilaria immitis*. Few adults of *A. aegypti* were captured in the villages and these contained no infection. Development of the infection occurred in some laboratory-bred mosquitoes fed on infected dogs. *C. p. fatigans*, *C. annulirostris* and *A. aegypti* all tolerated development to the 3rd stage; numbers of the other species were too small to be significant. *C. annulirostris* and *C. p. fatigans* are almost certainly the most common mosquitoes in the islands. *A. aegypti* appears to be rare in rural areas. *C. annulirostris* and *C. p. fatigans* and perhaps *A. aegypti* may therefore be vectors of the same importance in Fiji. *A. fijiensis* and *A. pseudoscutellaris* group may also contribute to transmission.

W. E. Kershaw

RUBTZOV, I. A. **Diptera. Vol. VI, part 6. Simuliidae** [in Russian].

This book is reviewed on p. 754.

See also p. 755, RUBTZOV [**Simuliidae of the Palaearctic Region**].

See also p. 755, CROSSKEY, **A Taxonomic Study of the Larvae of West African Simuliidae (Diptera: Nematocera) with Comments on the Morphology of the Larval Black-Fly Head.**

CHERRY, J. K. T. **The Treatment of Onchocerciasis.** *East African Med. J.* 1960, Aug., v. 37, No. 8, 550–58. [32 refs.]

It is stated that the purpose of this paper is to give a brief review of the existing literature and to report the methods and results of treatment in heavily infected patients. With the literature, readers of this *Bulletin* will be familiar. The patients treated were inhabitants of the area to the east of the Nile and 8 miles north of Jinja, Uganda. A single skin specimen was examined from each of 485 patients and in 76·7% microfilariae of *Onchocerca volvulus* were found. As only one specimen from each patient was examined it is probable that the true incidence of the infection was greater than this figure indicates. The youngest patient was 18 months old and the eldest claimed to be 105 years.

Treatment was carried out with either (i) suramin only in doses of 0·5 gm. initially followed by 1 gm. doses at weekly intervals to a maximum of 7·5 gm., (ii) suramin given as in (i) but to a total of 4·5 gm. and followed by 5·4 gm. diethylcarbamazine administered over 3 days. An aim in the second régime was to reduce the duration of treatment to as short a time as possible during which the patient was kept in hospital and any side effects controlled with either chlorpheniramine maleate, 10 mgm. intravenously twice daily, 4 mgm. thrice daily orally, pyranisamine maleate 100 mgm. thrice daily or prednisolone 10 mgm. thrice daily, tapered off on the 4th and 5th days. With the latter régime some nausea was commonly experienced but in no case had the treatment to be stopped and allergic reactions were minimal or absent.

Results were assessed by skin snip examination 10 months after treatment as it has been reported that microfilariae may live for 10 months. Administration of the full suramin course in the first treatment régime was hampered by defections in attendance of out-patients and although 276 commenced treatment only 46 completed the course. There were 42 who received 4·5 gm. suramin or more and who were reassessed after 10 months. Of these 27 or 64·3% were found to be free from infection as judged by examination of a single skin specimen. It was considered that the results at the 4·5 gm. level were satisfactory and that total doses in excess of this were almost invariably followed by undesirable toxic reactions.

With the second régime 60 patients were treated and 33 were assessed 3 or more months later. Only 2 were infected as judged by examination of a single skin specimen. Those with eosinophilia persisting beyond 3 months and who exhibited a typical allergic response to 50 mgm. diethylcarbamazine were given a further course of this drug. In 3 such cases a total of 3 courses of diethylcarbamazine finally relieved pruritus.

It is concluded that treatment with suramin and diethylcarbamazine offers a better chance of parasitological cure than does treatment with suramin alone and this suggests that the 2 drugs may be synergists in the treatment of this disease.

[An interesting and informative extension to this study would be to assess the results of treatment with diethylcarbamazine alone under the conditions here prevailing.] *A. W. Woodruff*

REINHARD, M. C., Jr. **Calcified Guinea Worm simulating Intrapulmonary Calcification.** *J. Amer. Med. Ass.* 1961, Jan. 7, v. 175, No. 1, 53–5, 3 figs.

SMIT, J. D. *Capillaria hepatica* **Infestation in a Dog.** *Onderstepoort J. Vet. Res.* 1960, Sept., v. 28, No. 3, 473–8, 6 figs. [11 refs.]

The case was seen in Pretoria.

CAVIER, R. & BELLON, R. Essai de traitement de la trichocéphalose par le sébacate de pipérazine. [**Trial of Treatment of Trichuriasis with Piperazine Sebacate**] *Bull. Soc. Path. Exot.* 1960, July–Aug., v. 53, No. 4, 626–9. [14 refs.]

The authors briefly summarize the literature on the treatment of human infections with *Trichuris trichiura* with various salts of piperazine. They themselves tested, in Guadeloupe, piperazine sebacate, which TURPIN *et al.* (*Thérapie*, 1957, v. 12, 56) found to be active against enterobiasis and ascariasis. SAVATON-PILLET (personal communication to the authors) found that 50–150 mgm./kgm. given to children aged 2 to 12 years for periods of 3 to 5 days separated by 2 weeks cured 15 out of 20 children with trichuriasis after 1 to 7 treatments, while in 2 children eggs of *Trichuris* persisted in the stools and the drug failed to cure 3 others after 4–8 treatments.

The present authors treated 41 patients (21 adults, 5 of them men) and 20 children aged 3 to 13 years (7 girls and 13 boys) with tablets each containing 250 mgm. of the drug. Children up to 5 years received 4 tablets daily, those between 6 and 10 years 8 tablets and adults 12 tablets. Each treatment lasted 2 days and was renewed, if necessary, every 3 weeks. After each treatment the stools were examined by the Willis technique.

The results were that 10 patients showed a 25 to 50% reduction of *Trichuris* eggs after 2 treatments and all the *Ascaris* eggs disappeared; 31 patients, after 3 treatments, showed a 75–90% reduction of *Trichuris* eggs; and 22 patients, after 4 treatments showed no *Trichuris* eggs, while in 9 patients a small number remained, although reinfection could not be excluded. Thus 4 treatments were needed to obtain 71% of cures. There were no signs of intolerance. The authors think that a higher dose and longer treatments would have given better results. *G. Lapage*

KARNAUCHOW, P. N. *Enterobius vermicularis* **Granuloma in the Inguinal Canal.** *Canadian Med. Ass. J.* 1961, Feb. 18, v. 84, No. 7, 388–9, 2 figs. [10 refs.]

A case from Ontario.

HAMMOND, J. B. & MCCOWEN, M. C. **The Treatment of Enterobiasis with New Formulations of Dithiazanine Iodide.** *Amer. J. Trop. Med. & Hyg.* 1960, Sept., v. 9, No. 5, 500–502. [13 refs.]

The authors refer to literature on the side effects of dithiazanine iodide and report on tests of 4 modifications of the commercial tablets of this drug,

designed by the Lilly Research Laboratories to lessen these side effects. These modifications are: dithiazanine I, in which methyl cellulose is added to the core of the tablet and the cellulose phthalate coating is thickened by about 150%; dithiazanine II, which is the same as I, but the coating is like that of the commercial tablets; dithiazanine III, which is like II, except that polyvinyl pyrrolidone is substituted in the core for methyl cellulose; dithiazanine IV, which is like II, but the size of the granules of dithiazanine iodide and methyl cellulose is "modified". Methyl cellulose and polyvinyl pyrrolidone act as cements, slowing down the disintegration of the tablets, so that the drug is distributed over a longer segment of the food canal and is also diluted.

These 4 modified tablets, and also the commercial tablets were given to children infected with *Enterobius vermicularis* with the following results:

Formulation	Daily dose	Number treated	Apparent cures	Incidence of side effects	Patients vomiting once only	Patients vomiting twice or more
Commercial tablets	300 mgm.	16	16	13	7	3
Commercial tablets	150 mgm.	27	23	15	3	2
Dithiazanine I, thicker coating, methylcellulose core	300 mgm.	21	21	5	0	0
Dithiazanine II, methylcellulose core	300 mgm.	23	22	4	1	0
Dithiazanine III, PVP core	300 mgm.	21	20	9	0	1
Dithiazanine IV, methylcellulose core with special granulation	300 mgm.	16	16	6	2	1

The total incidence of side effects and vomiting was significantly less when the modified tablets were used than when the full dose was given with the commercial tablets, and they were significantly less with dithiazanine II than with the other modifications and the modified tablets were not less effective. The authors discuss the possible correlation between reduction of the side effects and their observation that *in vitro* the modified tablets required longer to disintegrate in "simulated intestinal fluid". The modified tablets were identical with those used by FEBLES *et al.* [this *Bulletin*, 1961, v. 58, 76] and tablets II, III and IV were identical with those used by EVANS *et al.* [*ibid.*, 216].

G. Lapage

ROBINSON, H. A. & OLSEN, O. W. **The Role of Rats and Mice in the Transmission of the Porkworm, *Trichinella spiralis* (Owens, 1835) Raillett, 1895.** *J. Parasitology*. 1960, Oct., v. 46, No. 5, 589–97, 2 figs. [28 refs.]

About one-sixth of the rats collected from the city dump at Fort Collins, Colorado, were infected with *Trichinella spiralis*.

After infective meat containing cysts is eaten, a small proportion of the

cysts and larvae are excreted in the faeces. The survival of these faecal cysts and larvae was investigated experimentally. Mice and rats were fed on the faeces of other mice and rats given trichinosed meat under different conditions. After the infective meal, faeces infected 1 out of 30 mice when the faeces were dry and 2 out of 30 when moist. After 2 meals 2 in 30 were infected with dry faeces, 9 in 30 with moist. Similar results were obtained with rats.

The faeces contained cysts and larvae up to 4 days after an infective meal. After one meal up to 11% of the cysts ingested were excreted as cysts or larvae in the faeces, and after 2 meals between 5·6 and 92·2% were excreted in the faeces. Of the free larvae all died in less than 2 hours in dry faeces, and less than 4 hours in moist faeces, and the faecal cysts did not live longer than 8 days in dry faeces, and not longer than 27 days in moist faeces.

W. E. Kershaw

ZAIMAN, H., HOWARD, R. G. & MILLER, C. Joyce. **Mortality and Survival of Young Male Mice given Single Massive Doses of** *Trichinella spiralis* **Larvae.** *Exper. Parasit.* New York. 1960, Oct., v. 10, No. 2, 206–10.

"Three hundred and thirty-three 5-week-old male Swiss albino mice divided into 11 equal groups in four experiments were inoculated with single graded doses of *Trichinella spiralis* larvae. Doses ranged from 400 to 51,200 larvae per mouse.

"Within the limits of these experiments, (1) the number of deaths among mice infected with increasing numbers of larvae increased until a mortality of one hundred per cent. (100%) was reached. (2) Mean and median survival times varied inversely with the size of the inoculum. (3) There was no assurance that mean survival times for groups of homogeneous mice inoculated with equal dosages in different experiments would be comparable or precisely predictable."

LUKAŠENKO, N. P. [**Microprecipitation of Larvae of** *Trichinella spiralis in vitro* **as a Method of Vital Diagnosis of Trichinellosis in Swine**] *Helminthologia.* Bratislava. 1960, v. 2, No. 2, 105–10, 7 figs. [In Russian.]

The English summary appended to the paper is as follows:—

"The author studied the phenomenon of microprecipitation of the larvae of *Trichinella spiralis* in vitro as a means of vital diagnosis of experimental trichinellosis of swine. 24 pigs were used in the experiment out of which 16 were experimentally infected with trichinellosis, 2 with ascaridosis and 2 with trichocephalosis. 4 animals served as controls.

"In result of the experiment it was established that:

"1. the reaction of microprecipitation of larvae of *Trichinella spiralis* in vitro is highly sensitive and specific in the diagnosis of experimental trichinellosis of swine;

"2. the dynamics of accumulation of the precipitins in the blood serum of swine infected with trichinellosis is directly dependent on the intensity and duration of the infection."

[See this *Bulletin*, 1946, v. 43, 359.]

DEFICIENCY DISEASES

See also p. 763, WADSWORTH, **The Height, Weight and Blood Pressure of Healthy African Men on a Known Dietary Intake.**

McLAREN, D. S. **Sources of Carotene and Vitamin A in Lake Province, Tanganyika.** [Miscellanea.] *Acta Tropica.* Basle. 1961, v. 18, No. 1, 78–80.

"1. The vitamin A content of the livers of Lake Victoria fish, and the carotene content of certain green leaves have been determined.

"2. These are shown to be excellent sources of vitamin A readily available to the people of Lake and Central Provinces of Tanganyika, where vitamin A deficiency is common."

PALLISTER, R. A. **A Clinical Sign associated with Chronic Oedema and Malnutrition.** *Trans. Roy. Soc. Trop. Med. & Hyg.* 1961, Jan., v. 55, No. 1, 79–80, 1 fig.

The author describes and illustrates a painless condition of the skin in the lower extremities seen fairly frequently in elderly or middle-aged patients (mostly males) attending hospital in Penang, Malaya. The condition was never the reason for seeking medical advice and the patients presented with complaints of oedema and general ill health.

The skin condition is associated with long-standing oedema and consists of contraction and hardening of the skin around the feet and ankles and sometimes higher in the legs. The skin is of a leathery consistency and fits tightly around the bones. The slim ankle contrasts markedly with the swollen leg above it and is immediately striking to the observer. There is sometimes a brownish pigmentation. Higher in the leg there is the ordinary pitting oedema, which seems to be the immediate cause of the skin changes. The two areas are not clearly demarcated, but between them is an area of thickened skin which pits slightly on firm pressure. There is no tendency to ulceration or involvement of deeper structures.

All but one of the patients seen belonged to the poorer classes; they seldom wore shoes and most of them were ambulant, so that footwear or confinement to bed had played no part in the aetiology.

The commonest causes of the oedema were anaemia, malnutrition and hepatic cirrhosis; one or more of all these conditions were usually present if the patient was suffering from heart failure. Blood protein estimations were not available. *H. J. O'D Burke-Gaffney*

SAXL, O. & SKOUPÁ, M. Případ kwashiorkoru u 15 měsíčního dítěte. [**A Case of Kwashiorkor in a 15-Month-Old Child**] *Časopis Lékařů Českých.* Prague. 1961, Feb. 17, v. 100, No. 7, 215–18. [26 refs.]

The English summary appended to the paper is as follows:—

"The authors describe a case of kwashiorkor in a 15-month-old gipsy child,

the first case recorded in Bohemia and Moravia. The authors analyse their own experience and recent data quoted in the literature."

SCRAGG, Joan & RUBIDGE, Carol. **Kwashiorkor in African Children in Durban.** *Brit. Med. J.* 1960, Dec. 17, 1759–66, 6 figs. [42 refs.]

This paper records a study on African children admitted to hospital in Durban during the years 1955 and 1956, for treatment of the kwashiorkor syndrome. The total number of patients in this series was 1,565, and they comprised the bulk of the severely malnourished children who required hospital treatment. The frequency of the condition in Durban was shown by the fact that severe malnutrition accounted for 20% of the total medical admissions to the paediatric wards. The sexes were equally affected, and the average age of the patients was 22 months, with a range of 6–36 months.

The high incidence of the condition in Durban was attributed to poverty, poor environmental sanitation, lack of maternal care and the high illegitimacy rate, while acute infections, such as measles and dysentery, were frequent precipitating factors. There was therefore a seasonal variation in incidence, the condition being far commoner in the hot, humid months of January and February than during the cooler weather.

The diagnostic criteria adopted comprised (i) a history of protein deprivation, (ii) oedema due to hypoalbuminaemia of purely nutritional origin, (iii) retardation of growth, anorexia and apathy, and (iv) a variable dermatosis. [No reference is made to diarrhoea, which is an essential component of the syndrome.]

The authors note that effusion into joints and congestive cardiac failure were never seen. The dermatosis, which was present in 82% of patients, conformed to the classical description by TROWELL *et al.* [this *Bulletin*, 1955, v. 52, 496] and, in its fully developed form, indicated a bad prognosis. Skin ulceration occurred in about 20% of the affected children, being located over the buttocks, flexures, dorsa of the feet and behind the ears. Though the nose, ears and eyelid margins might slough, cancrum oris was not seen in this series. Acute corneal ulceration occurred in 14 patients, 13 of whom died. Stomatitis and hair changes followed the usual pattern. Hepatomegaly was found in 22·6% of the patients and was gross in 6·3%. Liver biopsy was not done but fatty livers were found in all but 1 of the 53 bodies examined at autopsy.

Associated infections comprised gastro-enteritis and bronchopneumonia in one-quarter of the children, and bacillary dysentery and otitis media in 10%, while pulmonary tuberculosis, amoebiasis, pyelonephritis and diphtheria were also well represented.

Grave anaemia was not a constant finding, and only 19·7% of the marrow smears obtained from those whose anaemia was marked showed megaloblastic change. The initial mean serum protein concentration was 4·1 gm./100 ml., with a mean albumin concentration of 1·2 gm./100 ml. The low initial serum cholesterol concentration of 78·6 mgm./100 ml. rose to 120·5 mgm./100 ml. on recovery. The blood urea level was in general low both on admission and on discharge from hospital.

Treatment was based on the administration of frequent small feeds of acidified skimmed milk to which was added calcium caseinate, alternating with

Darrow's solution [which contains potassium] by mouth. In the most severe cases, transfusions of blood, serum and plasma proved of great benefit. The average stay in hospital, which was much influenced by demand for bed space, was 30 days. Despite this, and their return to the same unfavourable environment, relapses were only noted in 4·5% of patients.

The total case mortality in this series was 52·5%. Although 203 deaths took place from uncomplicated kwashiorkor within 48 hours of admission, the majority of the 821 deaths were attributable to associated infections. This association was borne out at autopsy on 53 children, in whom an important inter-current infection was discovered in every case.

The paper ends with a very full discussion, with reference to the literature.

J. H. Walters

SPRUE

Ashworth, C. T., Chears, W. C., Jr., Sanders, E. & Pearce, M. B. **Non-tropical Sprue. Fine Structure of the Intestinal Epithelial Lesion.** *Arch. Pathology.* 1961, Jan., v. 71, No. 1, 13–19, 9 figs. [11 refs.]

The characteristic morphological lesion of the small intestine in sprue consists of blunting and atrophy of the intestinal villi and infiltration of plasma cells, lymphocytes and eosinophils in the lamina propria. Although this lesion is present in practically all cases of non-tropical sprue and is probably identical with the intestinal lesion in tropical sprue and in coeliac disease, its aetiological status is not clear: it is not known whether this epithelial lesion is the primary cause of malabsorption and the resulting nutritional deficiency, or is secondary.

This communication concerns the evaluation of electron microscopy of the mucosa of the small intestine in non-tropical sprue.

Biopsies of the small intestinal mucosa were obtained in 4 fasting patients with a Shiner peroral biopsy apparatus [this *Bulletin*, 1960, v. 57, 1206]. 2 of these had characteristic non-tropical sprue. The biopsy material was studied with light microscopy after paraffin embedding and staining with haematoxylin-eosin, periodic-acid-Schiff[PAS]-Alcian-blue and Giemsa stains.

The columnar absorptive cells of normal jejunal mucosa contain numerous, closely set microvilli averaging 1·3 μ in length and 0·08 μ in width. The inter-microvillous spaces are very uniform in width, averaging 15 mμ. It is calculated that there are 1,800 microvilli per cell and 1×10^8 microvilli per square millimetre of mucosal surface. Appearances of the fine vesicles in the cytoplasm are identical with those of the cytoplasmic vesicles of rat intestinal epithelium which form a system for the transport of absorbed particles through the epithelial cell cytoplasm.

Between individual cells there are narrow channels. Interlocking connexions between adjacent cells are found, desmosomes are present along the adjacent

cell margins, and a basement membrane is found immediately adjacent to the epithelial cell bases.

In addition to the absorptive cells, mucus-secretory cells are present. These contain cytoplasmic vesicles which are filled with finely granular mucus bodies of approximately 1 μ in diameter.

Microscopic study revealed similar alterations in the 2 cases of non-tropical sprue. The intestinal villi were atrophic, broad, short and fused, and the lining epithelial cells were irregularly reduced in size. The cuticular body was distinct and stained with PAS stain and with Alcian blue, which usually show up the mucus of the goblet cells. The lamina propria revealed extensive infitration with lymphocytes, plasma cells and eosinophils. No improvement in the mucosal lesion took place in one patient after 4 months of gluten-free diet.

Electron microscopy disclosed striking alterations in the epithelial cells in the 2 cases of sprue. The microvilli were reduced in number and were shorter, averaging 0·5 μ and 0·7 μ in length, respectively. It is calculated that in 1 sq. mm. of mucosal surface $5{\cdot}0 \times 10^7$ and $3{\cdot}3 \times 10^7$ microvilli were present respectively as compared with 10×10^7 for normal intestine. The terminal web was absent in most epithelial cells and also pinocytotic vesicles near the base of the microvilli and the more centrally located cytoplasmic vesicles were strikingly reduced in number, which resulted in more compact, denser cytoplasm.

The absorptive cells were narrower than normal and intercellular connexions were still intact, while the basement membrane was frayed and frequently interrupted.

Round, homogeneous bodies of variable size were noted in some of the plasma cells of the lamina propria and these probably represented Russell's bodies.

Intestinal absorption occurs through a more intricate mechanism than simple molecular diffusion across a semi-permeable membrane. A complex behaviour of the living cells is involved. Small particles are taken into the absorptive cells by pinocytosis. Contained within the vesicles, these substances are transported through the cells and are subsequently released into the lamina propria by reverse pinocytosis. It is apparent that absorption may also occur as the result of passive transfer or diffusion across cell membranes.

The decreased luminal surface area produced by shortening and thickening of the intestinal villi does not satisfactorily explain the decreased absorption which occurs in sprue.

It is paradoxical that in the case of idiopathic sprue in a patient who underwent clinical remission while taking a gluten-free diet, the alterations of the fine structure of the epithelial cells were still present 4 months later. The significance of this is unknown.

[See also this *Bulletin*, 1961, v. 58, 245.] *Philip Manson-Bahr*

JAIN, S. R. & SEPAHA, G. C. **Parasprue—a Malabsorption Syndrome. A Hematological, Biochemical and Therapeutic Study.** *Indian J. Med. Sci.* 1961, Jan., v. 15, No. 1, 1–19, 1 fig. [15 refs.]

This article is concerned with the malabsorption syndrome which the authors consider to be parasprue [this *Bulletin*, 1961, v. 58, 359]. They found that there was a considerable incidence of macrocytic anaemia and that in 20% of the

patients the bone marrow showed megaloblastic haemopoiesis. The fractional test meal showed the following results:

Achlorhydria	26 patients
i. Histamine fast	16 „
ii. Histamine activity	9 „
iii. Histamine not given	1 „
Hypochlorhydria	4 „
Isochlorhydria	20 „
i. Low (10–25)	11 „
ii. Medium (25–45)	8 „
iii. High (45–65)	1 „
Hyperchlorhydria	Nil.

The great majority of patients had a low serum albumin.

The best therapeutic results were obtained with crude liver extract rather than with purified vitamin B preparations.

The authors consider that parasprue should be diagnosed on the basis of diarrhoea, sore mouth, loss of appetite, loss of weight, discomfort after meals and the finding of starch granules, fat globules, and fatty acid crystals in appreciable amounts in the stools, but with the absence of dysentery.

The details of the 50 patients studied are shown fully in 10 tables and the pathogenesis is depicted in a figure. *H. Lehmann*

HAEMATOLOGY

CHARMOT, G., GIUDICELLI, P., REYNAUD, R. & RIGAUD, J. L. La dysprotéinémie commune de l'Africain. Essai d'interprétation. [**An Attempted Interpretation of the Dysproteinaemia Common in Africans**] *Bull. Soc. Path. Exot.* 1960, May–June, v. 53, No. 3, 582–97. [Numerous refs.]

In this review of the serum protein in Africans attention is drawn to the numerous reports on the raised gamma globulin values together with a tendency to low serum albumin. This is thought to be the outcome of hyperactivity of the cells which secrete the globulins. Malaria is considered to be the most important cause of this hyperactivity although it is not the only one. The possibility is not excluded that there is a genetic factor which determines the higher activity of the globulin-producing tissues. Malnutrition is considered a less important cause of disproportion between albumins and globulins although it is obvious that protein under-nutrition must play a part in causing the low serum albumin. Other factors are thought to be cirrhosis and parasitic diseases. There is no serious consequence of this changed albumin-globulin ratio which one can demonstrate. This article is a very valuable survey and notable for a very full collection of references to investigations of serum proteins from all parts of Africa. *H. Lehmann*

WENT, L. N., CHANNER, D. M., HARDING, R. Y. & CLUNES, B. E. **The Effect of Iron and Protein Supplementations on the Haemoglobin Level of Healthy Female Students.** *West Indian Med. J.* 1960, Sept., v. 9, No. 3, 209–14.

MATHUR, K. S., WAHI, P. N. & GUPTA, M. C. **Anaemia in Cirrhosis of the Liver—a Clinical Study.** *J. Indian Med. Ass.* 1960, Dec. 16, v. 35, No. 12, 539–44. [39 refs.]

See also p. 708, MARKKANEN *et al.*, **The Ascorbic Acid Content of Blood and Urine. A Study of Anemic and Non-Anemic Carriers of Fish Tapeworm.**

RAJASURIYA, K., NAGARATNAM, N., SOMASUNDERAM, M. & FERNANDO, C. F. O. **Nutritional Megaloblastic Anaemias of Ceylon.** *J. Trop. Med. & Hyg.* 1960, Dec., v. 63, No. 12, 275–86, 2 figs. [50 refs.]

This paper describes work in the Medical Department of Ceylon University. 76 severely anaemic patients were fully studied, 22 of them being pregnant women. The severe anaemia (Hb less than 8 gm./100 ml.) was ascribed to megaloblastic haemopoiesis because the marrow showed either (a) true megaloblasts (26 cases), or (b) intermediate megaloblasts (44 cases), or (c) giant stab cells (6 cases). It may be noted that none of the last group, and not all of the other group, showed macrocytes in the peripheral blood. When there was true megaloblastosis the serum iron was never below 83 μgm./100 ml.; it reached low levels in the other two groups, and when giant stab cells were the sole evidence of dyshaemopoiesis the serum iron ranged from 38 to 91 μgm./100 ml.

The effect of treatment was assessed after two weeks' medication. Patients with true megaloblasts responded well to either B12 or folic acid. When there were intermediate megaloblasts, the response to B12 was poor, but with iron and either B12 or folic acid it was good. No single medicament was used in the "giant stab cell" patients, but a moderately good response was obtained with iron, either with B12 or with folic acid. [Two weeks, of course, is too brief a period to determine whether iron alone would have been effective.] The authors believe the intermediate megaloblast to be produced only if there are multiple deficiencies, including iron lack.

A considerable number of other tests were made on these patients, without any remarkable findings. About two-thirds were infected with hookworms, and a quarter gave a history of malaria. They took a vegetarian diet, the staple being rice; and a large proportion had clinical signs of multiple vitamin deficiencies. They were thus a population characteristically prone to tropical nutritional anaemia. *Alan B. Raper*

GARGYE, A. K. & DATTA, D. V. **Infantile Megaloblastic Anaemia.** *Indian J. Pediatrics.* 1960, Aug., v. 27, No. 151, 288–92, 2 figs. [24 refs.]

A fatal case in an infant aged 9 months in Gwalior, India.

HELLER, P., YAKULIS, V. & JOSEPHSON, A. M. **Antigenicity of A_2 Haemoglobin.** [Correspondence.] *Nature.* 1961, Feb. 11, v. 189, 495–6, 2 figs.

It is possible to prepare antibodies which can differentiate between haemoglobins A and F. The authors have now succeeded in producing specific antibody against haemoglobin A_2 by injecting this fraction into rabbits together with Freund's adjuvant. Haemoglobin A consists of the two sub-units α_2 and β_2, and haemoglobin F of the two sub-units α_2 γ_2. The difference in the β_2 and γ_2 sub-units explains why it is possible to make antibodies which can differentiate between haemoglobins A and F. It is now known that haemoglobin A_2 is formed by the sub-units α_2 δ_2, and the chemical difference between δ_2 on the one hand and β_2 and γ_2 on the other, would explain why it is possible to make specific antibodies against haemoglobin A_2. *H. Lehmann*

WENT, L. N. & MACIVER, J. E. **Thalassemia in the West Indies.** *Blood.* 1961, Feb., v. 17, No. 2, 166–81. [41 refs.]

Since they first discovered thalassaemia (in combination with the sickle-cell trait) in the West Indies in 1956, the authors have added considerably to knowledge of the disease in the remarkably mixed population of those islands. This paper summarizes their work, much of which has already been noticed [this *Bulletin*, 1957, v. 54, 869; 1958, v. 55, 936 and 1162; 1959, v. 56, 212 and 213], and presents in tables a summary of 7 cases of thalassaemia major and 32 of thalassaemia minor (and of 2 families with Hb H, and 2 families with a "double" Hb A_2).

It is evident that the West Indian population can yield important data for the study of the biochemical genetics of thalassaemia. Before the very recent modern views on this subject were formulated [INGRAM and STRETTON, *ibid.*, 1960, v. 57, 632] the authors had recognized several varieties of the disease, which in the present paper they give as:—

(1) classical thalassaemia, in Chinese and Negroes;
(2) thalassaemia with a low or normal A_2 value, in Chinese;
(3) thalassaemic inheritance with no abnormalities except a raised Hb A_2 value, in Negroes;
(4) thalassaemia in which the only abnormality is a greatly raised level of Hb F, in Negroes;
(5) a debatable anomaly, the single finding of a significant degree of coarse basophilic stippling, in the Negro mother of a child with Hb H disease.

Although proof cannot now be offered, the authors attempt to apply modern views to these groups, allocating Group 1 to the β-thalassaemias, and Groups 3 and 5 to the α-thalassaemias. *Alan B. Raper*

RYAN, B. **Thalassaemia: Report of a Case in Papua.** *Med. J. Australia.* 1961, Jan. 28, v. 1, No. 4, 128–9.

HILLCOAT, B. L. **The Occurrence of β-Amino-Isobutyric Acid in the Urine of Patients with Thalassemia Major.** *Australian J. Exper. Biol & Med. Sci.* 1960, Oct., v. 38, Pt. 5, 441–5. [23 refs.]

β-amino-isobutyric acid, a degradation product of thymine, appears in increased quantities in the urine when nuclear destruction is increased. It was

slightly increased in the urine of 2 splenectomized patients with thalassaemia major, and considerably increased in 3 similar patients with intact spleens. This is an expression of the increased turnover of nuclear material during the "ineffective haemopoiesis" of thalassaemia.

[See also this *Bulletin*, 1959, v. 56, 876.] *Alan B. Raper*

MacIver, J. E. & Went, L. N. **Sickle Cell Anemia and its Variants.** *Quart. Rev. Pediatrics.* New York. 1959, July–Sept., v. 14, No. 3, 151–5. [18 refs.]

A short review and discussion with special reference to previous work by the authors [this *Bulletin*, 1958, v. 55, 936, 1162; 1959, v. 56, 213, 1183; 1960, v. 57, 748]. There is a very useful table indicating the findings in 14 syndromes associated with haemoglobin variants.

Pires, F. M. Contribuição para o estudo da drepanocitemia nos indígenas da Lunda. I. Incidência no grupo étnico lunda-quioco. [**Contribution to the Study of Sicklaemia in the Indigenous People of Lunda, Angola. I. Incidence in the Ethnic Group of Lunda or Quioco**] *Anais Inst. Med. Trop.* Lisbon. 1959, Jan.–Dec., v. 16, Nos. 1/4, 453–60. [19 refs.] English summary.

This paper contains a useful table of the sickle-cell incidence found in various overseas territories of Portugal from 1944 to 1959. The paper itself reports that in Angola the Lunda or Quioco showed a sickle-cell trait incidence of 213 among a thousand investigated. There was no sex difference but there was a significantly higher incidence of sickling under the age of 25.

H. Lehmann

Shaldon, S. **Megaloblastic Erythropoiesis associated with Sickle-Cell Anaemia.** [Memoranda.] *Brit. Med. J.* 1961, Mar. 4, 640–41, 1 fig. [11 refs.]

An account of 2 cases in Nigerian infants [see also this *Bulletin*, 1960, v. 57, 748].

Baglioni, C. & Ingram, V. M. **Four Adult Haemoglobin Types in One Person.** *Nature.* 1961, Feb. 11, v. 189, 465–7, 3 figs. [20 refs.]

This paper reports on a patient with 4 adult haemoglobins. One of them was haemoglobin G, which the authors find to have its abnormality in the α chain and the other haemoglobin C, which is known to have its abnormality in the β chain. The two other haemoglobins were seen to be haemoglobin A and a doubly abnormal hybrid composed of the abnormal α chains of G and the abnormal β chains of C.

These observations give chemical support for the independent inheritance of the α_2 and β_2 sub-units of human haemoglobin. The subject concerned inherited haemoglobin G ($\alpha_2 G \beta_2$) and haemoglobin C ($\alpha_2 \beta_2 C$). He was able to form

haemoglobin A ($\alpha_2\beta_2$) from the normal α_2 sub-unit of C and the normal β_2 sub-unit of G; furthermore he formed the doubly abnormal hybrid, $\alpha_2{}^G\,\beta_2 C$.

[A very similar case, if not identical, has been reported by RAPER and his colleagues (this *Bulletin*, 1961, v. 58, 367). In their case the evidence was based on dissociation of the various haemoglobins into their sub-units α_2, $\alpha_2 G$, β_2 and β_2 and their subsequent recombination. The present investigation is based on the chromatograms of the various peptide chains and their amino-acid sequences.] *H. Lehmann*

BAGLIONI, C., INGRAM, V. M. & SULLIVAN, Emilie. **Genetic Control of Foetal and Adult Haemoglobin.** *Nature*. 1961, Feb. 11, v. 189, 467–9, 4 figs. [20 refs.]

A woman was examined whose haemoglobin was found to consist of 70% of haemoglobin I and 30% of haemoglobin A. This finding was explained on the hypothesis that she was heterozygous for haemoglobins A and I and also carried a gene for α thalassaemia. The α thalassaemia gene restricts the formation of the α chain of normal haemoglobin, whereas the β thalassaemia gene affects the β chain formation.

The authors have examined the haemoglobin of a son recently born to this woman. He did not possess haemoglobin I, but haemoglobin Bart's was found. Haemoglobin Bart's is the tetramer γ_4 of the foetal haemoglobin γ chain ($F=\alpha_2\gamma_2$). The formation of haemoglobin Bart's would be due to a suppression of the α chain formation and it is suggested that in this case the child inherited α thalassaemia from the mother. The α thalassaemia gene would therefore not differentiate between the α chain of adult and foetal haemoglobin.

H. Lehmann

HUEHNS, E. R., FLYNN, F. V., BUTLER, Elizabeth A. & BEAVAN, G. H. **Two New Haemoglobin Variants in a Very Young Human Embryo.** [Correspondence.] *Nature*. 1961, Feb. 11, v. 189, 496–7, 1 fig. [16 refs.]

In a human foetus from a 10½ weeks' pregnancy two haemoglobin variants were found which differed from any previously described. On starch gel electrophoresis at *p*H 8·8 they moved more slowly than haemoglobin A. One of them, Gower I, had a spectrum similar to haemoglobin A, the other, Gower II, had an ultra-violet spectrum of the foetal type. *H. Lehmann*

VENOMS AND ANTIVENENES

DANON, D., GITTER, S. & ROSEN, M. **Deformation of Red Cell Shape Induced by *Vipera palestinae* Venom *in vivo*.** [Correspondence.] *Nature*. 1961, Jan. 28, v. 189, 320–21, 2 figs.

It has already been shown that the venom of *Vipera palestinae* can cause disk-sphere transformation of red cells *in vitro* in the presence of plasma

without producing haemolysis. This phenomenon can be reversed by suspending the spherical red cells in normal plasma (GITTER *et al.*, *Arch. Int. Pharmacodyn.*, 1959, v. 118, 350).

The present article describes *in vivo* experiments in which the venom is injected into rats and rabbits and samples of blood are withdrawn at various intervals, for observations on the morphological changes induced by the venom on the red cells of these animals under varying conditions as compared with control animals. In normal unanaesthetized animals 95–100% of the red cells were bidiscoid, but in anaesthetized (urethane or phenobarbital sodium) animals not treated with venom, the majority showed some degree (0–37%) of deformation; bidiscoidal cells could no longer be recognized but the deformation had not yet advanced to crenation. After intramuscular injection of the venom, however, the degree of deformation as well as the percentage of red cells showing advanced deformation was significantly increased with time. And with increasing dosage of venom the changes occurred more rapidly (within half an hour). Sublethal doses in anaesthetized animals induced maximum deformation in about 3 hours. The cell morphology subsequently reverted to the normal bidiscoidal pattern within 6–48 hours. Lethal doses (2·5 mgm./kgm. intramuscularly) produced rapid and progressive deformation, culminating in complete sphering. The maximum effect was reached in unanaesthetized animals shortly before the animals died but ghost-cells were never seen. This agrees with the earlier *in vitro* observations that the venom of *V. palestinae* had no direct haemolytic activity [this *Bulletin*, 1957, v. 54, 873] and contrasts with the effect seen after the injection, under similar conditions, of cobra venom when ghost-cells are a characteristic finding. The venom of *Naja naja* is known to have direct haemolytic activity.

It is suggested by the authors that the degree of deformation of the red cells, after a bite of *V. palestinae*, might be used to assess the severity of such bites in man. *H. J. Bensted*

BALOZET, L. Les antigènes du venin de scorpion (*Androctonus australis*) étudiés par l'électrophorèse et la précipitation en gélose. [**Study of Scorpion (*Androctonus australis*) Venom by Electrophoresis and Gel Precipitation**] *Arch. Inst. Pasteur d'Algérie*. 1960, Dec., v. 38, No. 4, 465–71, 1 text fig. & 3 figs. on 2 pls. [23 refs.]

BARNES, J. H. **Observations on Jellyfish Stingings in North Queensland.** *Med. J. Australia*. 1960, Dec. 24, v. 2, No. 26, 993–9, 2 figs.

Between 16° 17′ and 16° 57′ S. on the Queensland Coast 116 cases of stinging were examined from November 1956 to May 1960. Cases were classified as Type A (without wealing, but with severe general effects: 44 patients) and Type B (wealing but no pronounced general effects: 59 patients). 13 cases were unclassified.

The jellyfish involved were *Physalia* spp. (Portuguese man-of-war), Cubomedusae (box jellies) and *Cyanea* spp. ("snotties"). The author gives brief and very clear descriptions of each and describes the characteristic clinical features of each "sting".

Physalia is small and formed of a small crested sausage-shaped blue balloon equipped with submerged finger-like processes and usually only one main long dark blue tentacle which exceeds 8 feet when extended but measures only a few inches when contracted. The extended tentacle produces a long thin linear lesion usually in the form of a discontinuous line of weals corresponding to individual stinging nematocysts. A wider injury is caused by the contracted tentacle. Single lesions are the rule. In experimental lesions produced on the author vesication did not occur. Pain was not severe if contact was of short duration; prolonged contact produced severe discomfort.

The Cubomedusae are cuboid, colourless and transparent. They measure a few inches across. They move by jet propulsion and avoid water turbulence. Contact is accidental. Two species are involved, namely *Chironex fleckeri* and *Chiropsalmus quadrigatus*. Both have four fleshy submerged arms which divide into fingers from each of which a tentacle trails, armed with transversely arranged rings of nematocysts. Stings may be extremely severe and are believed to be sometimes fatal. Areas of contact are linear and multiple and there is often a pattern of transverse bars corresponding to the stings of nematocysts. Wealing is prompt and severe and followed by oedema, erythema and vesication. The full thickness of the skin may become necrosed and heal by scarring. Nematocysts are often left in the skin and can be identified. General effects are not always present, even in massive stinging.

Cyanea is a "repulsive big slimy jellyfish" looking like a "mop hiding under a dinner-plate". The disc measures 10 inches or more across and is scalloped into 16 lappets. From the disc may hang as many as 1,000 tentacles each 5 feet long when relaxed and up to 20 feet when stretched. Nematocysts occur as detached islands in the extended tentacle but are tightly packed when it is relaxed or contracted. The sting area is usually traversed by long, narrow, roughly parallel weals each surrounded by a narrow zone of pink erythema. There is usually little vesication or necrosis. The first symptom is a "sticky sensation". Further contact results in severe burning pain, erythema and punctate wealing. The erythema may persist for days. A detached tentacle may produce a single linear injury; a tangled rope of tentacles may cause severe local lesions. There may be profound general effects.

Diagnosis of the causative agent is best decided by its capture and examination. The characteristics of nematocysts are helpful aids in diagnosis. The cysts may be found in the slime of a *Cyanea* sting, or caught in the skin or observed in fragments of tentacle adhering to skin or clothing. Nematocysts may be removed from the skin by adhesives, for example by application of nearly dry clear mucilage; they may also be scraped off with a knife. The clinical features and characteristic patterns of the lesions are also helpful.

Stingings occur mostly in the summer. *Physalia* may be blown near beaches and stranded. Cubomedusae are found in the sheltered waters; calm weather is the time of greatest risk. *Cyanea* drifts with water movement and is found in deep water, sometimes driven into rivers and beaches by the prevailing winds. *B. G. Maegraith*

TOXOPLASMOSIS

DUNAEVA, Z. V. & ZASUKHIN, D. N. [**Contribution to the Study of Natural Toxoplasmosis Foci**] *Med. Parasit. & Parasitic Dis.* Moscow. 1961, v. 30, No. 1, 84–6, 125. [13 refs.] [In Russian.]

The English summary appended to the paper is as follows:—

"A total of 1050 wild animals have been examined for toxoplasmosis (by the investigation of smears) in the Kalinin region, most of them being insectivorous and rodents. Toxoplasma gondii was disclosed in smears taken from the liver, spleen and brain of Sorex araneus, S. macropygmaeus and S. minutus. The parasites were encountered as individual cells and pseudocysts. Attempts to isolate the toxoplasma strains by staging biological tests on white mice (75 tests) remained unsuccessful. During examination of smears the authors could detect some other parasites of the blood and tissues, such as: Grahamia, Hepatozoon and Lamblia."

BARTOSZEWSKI, A., SIKORSKI, R., STROCZYNSKA, M., TOŚ-LUTY, S. & UMINSKI, J. **Statistical Presentation of Results of the Complement Fixation Test in Toxoplasmosis.** *Acta Parasitologica Polonica.* 1960, v. 8, Nos. 21/32, 451–60. [20 refs.]

The authors note that toxoplasmosis appears to be widespread but generally asymptomatic. In literature quoted infection as judged by intradermal tests varied from 10% to 47%. Surveys in Poland by this method had given from 25% to 34% incidence. They made a further survey in the Lublin region using the complement-fixation test, and regarding titres of 1 in 4 upwards as positive. The groups examined were (1) 375 pregnant women, (2) 252 healthy post-partum women, (3) 333 women who had had stillbirths, abortions, or foetal abnormalities either recently or in the past, (4) 131 healthy blood donors, (5) 216 workers at a meat plant.

They first investigated whether the percentage of positive results increased with age as indicated by JIROVEC *et al.* [this *Bulletin*, 1958, v. 55, 213]. They found no statistical basis for this in their own results.

They next examined the incidence in the different groups. Of the total of 1,307 persons examined 6·5% gave a positive test. Healthy blood donors had the highest incidence of 9·9%. Women with a history of abortion or other abnormalities 9·3%, and women in a healthy and normal post-partum state 7·5%. This difference was significant statistically and was what might be expected. Meat plant workers showed only 5·5% positives. This was unexpectedly low as they were considered to have a greater chance of acquiring infection from their close contact with animals. No explanation was available for the high incidence in healthy blood donors. The pregnant women had the lowest incidence at 2·6%.

The authors then analysed their results to see whether there was a difference between subjects from a rural and those from an urban environment. 8·4% were positive in those regarded as rural, and 5·4% in those regarded as urban. This result was also statistically significant.

They found no difference in the results between the sexes. [They do not

comment on the much lower incidence (under 10%) with the complement-fixation test than with the intradermal test (20%–40%).] *A. C. E. Cole*

PYTEL, Laura, DYMOWSKA, Zofia & KOZŁOWSKA, Danuta. Próba określenia roli toksoplazmozy w etiologii wad rozwojowych płodów. [**An Attempt to define the Role of Toxoplasmosis in the Aetiology of Congenital Abnormalities**] *Wiadomości Parazytologiczne*. Wrocław. 1960, v. 6, No. 5, 415–23. English summary.

The authors have investigated the part played by toxoplasmosis in the causation of congenital defects and abnormalities of pregnancy in 30 women giving birth to infants with congenital defects and in women who had had an abortion or had given birth to a dead foetus; 50 normal pregnancies were observed as a control group. The observations were made over a 3-year period in a maternity hospital in Łodz, Poland, during which the incidence of congenital abnormalities was 0·96%. The *Toxoplasma gondii* complement-fixation and skin tests were both positive in 5 women of the first group and in none in the other 2 groups. Attempts to isolate the parasites or observe them microscopically were unsuccessful in all of 23 instances. It is concluded that although toxoplasmosis was of frequent occurrence, no definite evidence had been obtained that it was associated with abnormalities of pregnancy.

D. J. Bauer

MITCHELL, R. G. & GREEN, C. A. **The Haemagglutination Test for Toxoplasma Antibodies.** *J. Clin. Path.* 1960, July, v. 13, No. 4, 331–5, 4 figs. [10 refs.]

The authors applied the haemagglutination test to a group of people (446) attending the blood transfusion department at the Royal Victoria Infirmary, Newcastle-on-Tyne. The details of the test cannot be repeated here, but briefly the antigen was prepared by ultrasonic disruption of organisms obtained from 4-day-old peritoneal exudate of mice and was stored at –20°C. (at which it showed a gradual loss of potency over 8 weeks) and the test was performed according to the Boyden technique [*Bull. Hyg.*, 1956, v. 31, 204] with human group O Rh-negative cells in place of sheep cells, on dilutions up to 1 : 20,480 of inactivated sera. Positive reactors increased with age, from 11% in children below 9 years to 62% in people over the age of 70. There was little association between height of titre and age, but some very high titres were encountered (the highest of 1 : 160,000 occurring in 2 active cases of the disease, not included in this series).

Attempts were made to correlate these reactions with the Sabin Feldman dye test, but no quantitative relationship was found in 2 separate groups of people; *e.g.*, in a series of 73 sera, 20 with a positive dye test gave a negative haemagglutination test, but it is rightly pointed out that there is no reason to assume that the 2 tests should give parallel results, because they probably measure different types of antibody [see also JACOBS and LUNDE, this *Bulletin*, 1957, v. 54, 1463, 1464]. The test is extremely sensitive, and if stability of antigen could be assured, might prove to be of great value.

P. C. C. Garnham

TALICE, R. V., ROYOL, J., PEREZ-MOREIRA, L. & GURRI, J. Intradermorreacción con toxoplasmina en adultos y niños sanos, en una ciudad del norte del Uruguay. **[Intradermal Reaction with Toxoplasmin in Healthy Adults and Children in a City in the North of Uruguay]** *An. Facul. de Med. Montevideo.* 1960, v. 45, No. 2, 101–6, 6 graphs. [10 refs.] English summary.

A survey of a proportion of the inhabitants of the town of Rivera on the Brazilian frontier of Uruguay was carried out for evidence of infection with *Toxoplasma* by means of Frenkel's skin test. 406 healthy (*i.e.* free of signs of active toxoplasmosis) adults and children were examined. 38% of the adults and 20% of the children gave a positive reaction; 31% of women and 40% of men were positive as compared with 19% of girls and 21% of boys. In general there was a gradual increase in infection up to the age of 34 years, followed by an inexplicable decrease. These rates are higher than those in the capital. *P. C. C. Garnham*

TALICE, R. V., GURRI, J., PEREZ-MOREIRA, L. & ROYOL, J. La intradermorreacción con toxoplasmina en un grupo de adultos tuberculosos. **[Intradermal Reaction with Toxoplasmin in a Group of Tuberculous Adults]** *An. Facul. de Med. Montevideo.* 1960, v. 45, No. 2, 95–100, 7 graphs. [21 refs.] English summary.

The toxoplasmin skin test was applied to a group of men and women in Montevideo, Uruguay, suffering from open pulmonary tuberculosis (with positive tuberculin tests). 0·1 cc. was inoculated intradermally into the arm and the result was read 48 and 72 hours later. 424 patients were tested and an overall rate of 14% positive was obtained, which is lower than the rate for the general population of Uruguay (which was found in a previous investigation to be 26% [this *Bulletin*, 1961, v. 58, 633]). The rate was higher in the women (18%) than in the men (13%) and in the inhabitants of the interior (18%) than in those of Montevideo (9%).

It is clear from these results that tuberculosis shows no cross-reaction in the skin test with toxoplasmosis. *P. C. C. Garnham*

BUDZILOVICH, G. N. **Acquired Toxoplasmosis: a Clinicopathologic Study of a Case.** *Amer. J. Clin. Path.* 1961, Jan., v. 35, No. 1, 66–76, 11 figs. [21 refs.]

A white male aged 82 presented with generalized weakness, anorexia, loss of 18 lb. body weight and general enlargement of lymph glands, developing over a period of 3 months. The onset was characterized by a transient "pneumonia" (without cough or pain), fever and malaise. The glandular enlargement was noted some weeks later. One week from the onset, an eruption appeared on the trunk and limbs, but not on the face. The rash took the form of discrete pinkish macules up to 1·0 cm. across, plus pruritus. It subsided in a fortnight but the pruritus persisted. At the same time the patient noted a complete loss of taste sensation over the whole tongue.

On examination there was gross adenopathy. The glands were rubbery,

mobile and not tender. There were a few excoriated macules on the trunk. Taste was absent over the whole tongue. The liver and spleen were both enlarged. Haemoglobin was 8 gm. per 100 ml., the white cell content, 10,200 cells per cmm. (20% eosinophils). In the last days of life atypical lymphocytes appeared and there was a patchy pneumonia with some pulmonary oedema. *Staphylococcus aureus* was grown from the blood.

While in hospital biopsies of glands were taken. The patient died in coma 43 days after admission.

At autopsy all lymph glands were enlarged. Those in the axillae were conglomerate. In the cerebrum, mid-brain, cerebellum and medulla there was irregular slight infiltration of the perivascular spaces with lymphocytes. Foci of necrosis, with glial proliferation occurred in the grey matter of the basal ganglia and cortex. In one glial nodule proliferating *Toxoplasma* bodies were found in an enlarged glial cell. Many terminal colonies of *Toxoplasma* (identified as PAS-positive granules) were found in individual heart muscle fibres. These were not associated with any inflammatory reactions.

Bodies like *Toxoplasma* were found also in the spleen and in occasional epithelial cells of an interlobular bile duct. Pseudocysts were found in glands removed at autopsy which displayed a specialized granulomatous reaction. Foci of fragmentation associated with lymphocytic infiltration were found in the neck muscles. There was a granulomatous glossitis, with diffuse infiltration with occasional giant cells and increase in fibrillar collagen in the submucosa. Some of the superficial serous glands were infiltrated with plasma cells and lymphocytes. There were some scattered granulomatous reactions in the deeper tissues.

The author suggests that infection may have entered *via* the upper alimentary tract. This is suggested by the history of early loss of taste and the stomatitis. The granulomatous glandular changes are described and illustrated in full detail and distinguished from other granulomatous forms of lymphadenitis.

B. G. Maegraith

DERMATOLOGY AND FUNGUS DISEASES

MANN, G. T. & BATES, H. R., Jr. **The Pathology of Insect Bites: a Brief Review and Report of Eleven Fatal Cases.** *Southern Med. J.* 1960, Nov., v. 53, No. 11, 1399–406, 5 figs. [20 refs.]

The term " insect bite " signifies any penetrative lesion caused by a member of the classes Insecta and Arachnida. The intensity of the local reaction depends upon the sensitivity of the person bitten, on the type of insect and on the duration of the bite. Oedema of the dermis is accompanied by an infiltration with polymorphs and lymphocytes; later lymphocytes predominate and finally, after several hours, histiocytes, plasma cells and eosinophils appear. This last response appears to represent a local allergy, for it does not follow simple trauma. The allergen may be contained in dust from the wing and body of the insect, or in its saliva, venom or faeces. Secondary bacterial contamination is most common in wasp and hornet stings, since their bodies are often contaminated by reason of their scavenging habits. Local granulomatous lesions closely

resembling epitheliomata may develop, and a generalized reaction may simulate the skin manifestations of any of the reticuloses, sarcoidosis or mycosis fungoides. Urticarial, eczematous and systemic reactions may also occur.

Death usually results from acute anaphylaxis in persons known to react violently to insect bites. In the state of Virginia, 11 persons died in this manner in the period 1951–59 inclusively. Short notes on each are given. The desensitization of people who are known to react in this manner should clearly be attempted. *J. H. Walters*

RODRIGUEZ M., J. D. Piedra en Ecuador. **[Piedra in Ecuador]** *Mycopathologia.* The Hague. 1961, Feb. 20, v. 14, No. 1, 31–8, 7 figs.

The English summary appended to the paper is as follows:—

"This work deals with some observations on Piedra in the Republic of Ecuador and it is a part of a general review about superficial mycoses which is now carried out in Guayaquil.

"This study comprises the two varieties, black and white. Besides the description of the nodule, with its microscopic characteristics, the cultures are also described in both aspects: macroscopic and micromorphologic.

"In black Piedra details of the asci are presented along with ascospores of *P. hortai* (Brumpt) Fonseca and Leao, 1928. The author found certain resemblance between the ascospores described and those of *P. javanica* Boedijn and Verbunt, 1938. Typical black colonies were obtained besides other *Trichosporon* type about which some interpretations are made.

"In white Piedra its rarity is mentioned. The isolated organism is identified with *T. giganteum* Behrend, 1890 and its microscopic and cultural characteristics are described."

SMITH, A. G. & GILLOTTE, J. P. **Aberrant Forms of *Coccidioides immitis* in a Coccidioidoma. Review of the Literature and Report of a Case.** *Amer. J. Clin Path.* 1960, Nov., v. 34, No. 5, 477–87, 17 figs. [57 refs.] [Reprinted from *Tech. Bull. Registry Med. Technol.* 1960, Oct., v. 30, No. 10, 171–81.]

This is an interesting account of the morphological diversity of *Coccidioides immitis* found in 2 coccidioidomas in a case of pulmonary coccidioidomycosis.

The fungal structures described are listed as follows:

Lesion A. Stages in spherule cycle

1. Immature spherule
2. Mature endospore-filled spherule
3. Unmasked endospores

Lesion B. Aberrant forms

1. Bead-like chains
2. Nodular forms
3. Yeast-like forms
4. Hyphal forms

It was found that some of these structures could be demonstrated more clearly by some staining techniques than by others; thus, the haematoxylin and eosin

stain was generally more unsatisfactory for all these structures, whereas the periodic-acid-Schiff procedure was generally very satisfactory, as was also the methenamine-silver reaction. The periodic-acid-Schiff reaction was especially useful for demonstrating the capsules of nodular forms included in the necrotic material of one of the lesions; while, although methenamine silver stained them extremely densely it failed to reveal the capsule surrounding them.

The finding of morphologically different forms of the same fungal parasite in two separate but closely situated lesions raises the problem of the influence of environmental factors on the morphology of fungal parasites. This problem is fully discussed by the authors.

It is generally conceded that for accurate diagnosis cultural as well as histological evidence is desirable. This is made all the more apparent by the observations recorded in this paper. *C. J. La Touche*

TROPICAL OPHTHALMOLOGY

PHILLIPS, C. M. **Blindness Survey in Chief Mununga's Area, Kawambwa District, Northern Rhodesia.** *Rhodes-Livingstone Communication No. 15.* 1959, 1–20, 1 fig. Lusaka: The Rhodes-Livingstone Institute.

This is a most interesting paper. Some years previously the author successfully operated upon a man with binocular cataract who later revealed that he was a practitioner of Mankoya medicine specializing in eye diseases. A certain professional intimacy developed between the two doctors with the result that when Phillips undertook this survey his former patient was extremely cooperative. For this reason this report is of particular value to those interested in the estimation of the incidence and causes of blindness. The incidence of blindness in this area is extremely high, amounting to 2,369 per 100,000 of the population. This is in excess of that encountered in some of the worse onchocercal areas in Africa. The principal cause of blindness is measles resulting in corneal lesions. "83% are blind before the age of 10, 80·3% attribute it to measles, and the causal lesions are corneal leucomata in all its forms or phthisis bulbi in 93% of all those with either monocular or bilateral blindness (as compared with 44% of the 2,170 blind seen throughout the territory)."

"No acute cases of massive corneal ulceration or necrosis were seen, such as must be the forerunners of the lesions responsible for blindness. Onchocerciasis can definitely be ruled out and so can trachoma."

The conclusion is that "some highly 'noxious factor' acts on eyes previously rendered more susceptible by conjunctivitis per se or by accompanying measles. These diseases do not normally lead to blindness of such an extent met with on this survey, even if left untreated. Malnutrition is definitely not present in the population as a whole, so this also can be excluded as a contributing factor".

The further conclusion is "that the universal use of customary African treatments supplies the necessary 'noxious factor'. When in powder form these treatments must be highly injurious from their abrasive action if for no other reason. When in liquid form they may be harmful by reason of their

alkalinity, chemical toxicity or by introducing into a diseased eye fungus infection or virulent organisms with the concoction. The method of preparation of these solutions outlined in Appendix II is obviously so rudimentary and unhygienic that added infection must take place". Their continued use must be discouraged or forbidden by all methods. *D. P. Choyce*

BERNKOPF, H., MASHIAH, P. & MAYTHAR, B. **Cultivation of a Strain of Trachoma Virus in the FL Line of Human Amnion Cells.** *Bull. Res. Counc. of Israel.* 1960, Nov., v. 8E, No. 4, 121–7, 9 figs.

The authors have found that a strain of trachoma virus, isolated orginally in China [this *Bulletin*, 1958, v. 55, 96], grew satisfactorily in an established line (FL) of human amnion cells. Single virus particles were seen in the outer zone of cytoplasm of the infected cells at the 4th hour. They increased in size and number and at the 16th to 20th hours were up to 1–2 μ in diameter and forming clumps in a juxtanuclear position. At 28 hours virus particles of elementary body size appeared; they were in vacuoles which enlarged and at 32–36 hours vacuoles containing elementary bodies dominated the picture. After 4 tissue culture passages the virus readily infected developing eggs when injected by the yolk sac route and after 2 further passages produced a follicular conjunctivitis in a volunteer. *S. P. Bedson*

MISCELLANEOUS DISEASES

BACK, E. H. **The Child of the Tropics.** *Quart. Rev. Pediatrics.* New York. 1959, Oct.–Dec., v. 15, No. 4, 224–37, 5 figs. [14 refs.]

An account of disease patterns of children below and above the age of 2 years and of epidemic, endemic and other diseases, based on a study of 1,890 children admitted to the University College Hospital in Jamaica between 1955 and 1958.

EMANUEL, B. & SCHOENFELD, A. **Favism in a Nursing Infant.** *J. Pediatrics.* St. Louis. 1961, Feb., v. 58, No. 2, 263–6. [35 refs.]

"1. A case of favism in a breast-fed infant of Mediterranean parents has been described.

"2. Glutathione levels and glutathione instability were measured and found to be abnormal during the recovery period.

"3. The reactive substance in fava beans which induces hemolytic anemia in glucose-6-phosphate deficient individuals was transmitted through the mother's milk.

"4. The affected female infant most likely represents the homozygous state for a sex-linked disorder.

"5. Jaundiced breast-fed children from parents of Mediterranean countries should be watched for favism."

BOWMAN, J. E. & WALKER, D. G. **Action of *Vicia faba* on Erythrocytes: Possible Relationship to Favism.** *Nature.* 1961, Feb. 18, v. 189, 555–6.

HIGGINSON, J., ISAACSON, C. & SIMSON, I. **The Pathology of Cryptogenic Heart Disease. A Study of the Pathological Pattern in Eighty Cases of Obscure Heart Failure in the South African Bantu Negro.** *Arch. Pathology.* 1960, Oct., v. 70, No. 4, 497–507, 9 figs. [31 refs.]

This report is from the Geographical Pathology Unit, South African Institute for Medical Research and the Department of Pathology, Baragwanath Hospital, Johannesburg, South Africa. The morbid anatomy and histological appearances are described in the hearts of 80 Bantu patients who died after suffering from recurrent low-output cardiac failure of obscure origin: here termed cryptogenic heart disease. In a total of 2,367 necropsies death in 537 (22·7%) was due to heart failure, and 80 of these were classified as cases of cryptogenic heart disease, fourth in the list of causes of heart failure in these patients.

The hearts were hypertrophied and dilated, and in 48 hearts thrombi were present in the lumen, in some recent and lying on an apparently intact endocardium, in others forming fibrous plaques obliterating the spaces between the trabeculae carneae, and occasionally with fibrous bands, deep to the thrombi, extending into the myocardium. Thrombi were most frequently at the apex of the left ventricle. There were no significant valvular lesions and while some hearts showed mild atherosclerosis of the coronary vessels, in no case was there significant narrowing of these. The histological examination suggested that thrombi were invaded by fibroblasts from both the endocardial surface and the surface of the lumen, and that new capillaries formed sometimes with a surrounding deposit of haemosiderin. Later the thrombi become converted into relatively avascular fibrous plaques. The myocardium showed hypertrophy, in 17 cases with some small foci of fibrous scarring and occasionally mild, scanty lymphocytic infiltration.

Discussion of these results leads to no final conclusion regarding aetiology. It is considered that stasis plays an important part in intracardiac thrombosis, presumably because of myocardial dysfunction, of which the cause is not known. Comparison and contrast is drawn between these cases and those believed due to chronic malnutrition [GILLANDERS, this *Bulletin*, 1953, v. 50, 141], endomyocardial fibrosis [WILLIAMS *et al., ibid.*, 1955, v. 52, 203] or cardiac beri-beri (GRUSIN, *Circulation*, 1957, v. 16, 27). *S. Bell*

WEBB, J. K. G. **Aetiology of Tropical Eosinophilia.** *Indian J. Pediatrics.* 1960, May, v. 27, No. 148, 147–57, 8 figs. [16 refs.]

See this *Bulletin*, 1960, v. 57, 1117.

SCHACHER, J. F. & DANARAJ, T. J. **Intestinal Helminths in relation to Eosinophilic Lung (Tropical Eosinophilia) in Singapore.** *Amer. J. Trop. Med. & Hyg.* 1960, Nov., v. 9, No. 6, 616–19. [13 refs.]

In order to test whether or not an association exists between intestinal helminthic infection and eosinophilic lung the stools of 569 male patients in

the General Hospital, Singapore, were examined. The method used was the Beaver modification of the zinc sulphate flotation method of Faust. The parasites noted were ova of *Ascaris lumbricoides, Trichuris trichiura,* hookworm species, and the larvae of *Strongyloides stercoralis.*

The 569 patients included 311 considered to have eosinophilic lung (based on clinical presentation, response to diethylcarbamazine and eosinophilia of more than 3,000 per cmm.), 112 with mild eosinophilia of from 500–3,000 per cmm., and 146 with less than 500 eosinophils per cmm. The last two groups formed the controls. As eosinophilic lung has been said to be commoner in Indians in Singapore [this *Bulletin,* 1952, v. 49, 316] the patients were subdivided into the ethnic groups of Indian, Chinese, or Malay.

The results did not show any correlation between eosinophilic lung and infection with these four worms. Thus *Ascaris* ova occurred in 13% of those with eosinophilic lung compared with 21% of those with mild eosinophilia and 12% of those with no eosinophilia: hookworm in 42% of those with eosinophilic lung compared with 45% and 36%; *Trichuris* ova in 61% compared with 68% and 61%; *Strongyloides* larvae in 6% compared with 3½% and 1%.

When the prevalence in different ethnic groups was analysed there was considerably more infection in Malays, *Ascaris* occurring in 34% compared with 14% in Chinese and 13% in Indians. There were also variations in the prevalence at different ages, *Ascaris* occurring more frequently in the youngest, and hookworm in the third decade. In order to make sure that the ethnic differences were not due to differences in age distribution, and that no associations were masked, the observed numbers in each subgroup, both ethnic and eosinophilic, were compared with the expected numbers by using the overall age-distribution and infection rate, and the significance tested by the χ^2 test.

No significant differences were found between the different eosinophilic categories in respect of prevalence of *Ascaris,* hookworm, or *Trichuris* in any ethnic group when allowance was made for age. A significant excess of infection was still evident among the Malays, indicating that any excess of eosinophilic lung in Indians is not associated with increase in infection with these worms. *A. C. E. Cole*

PARASITOLOGY: GENERAL

i. Mello, A., Mello, Nilva R., Bourroul, G. P. & Gomes, L. F. de S. Verificações helmintológicas em 3,000 exames de fezes. **[Helminths found in 3,000 Examinations of Faeces]** *Rev. Inst. Adolfo Lutz.* São Paulo. 1959, v. 19, 75–85. [Numerous refs.] English summary.

ii. Mello, Nilva R., Mello, A., Bourroul, G. P. & Gomes, L. F. de S. Protozoários em 3,000 exames de fezes. **[Protozoa found in 3,000 Examinations of Faeces]** *Ibid.,* 87–95. [30 refs.] English summary.

In these two papers the authors, writing from a hospital in São Paulo, Brazil, refer at very considerable length to the literature on intestinal parasites in other parts of Brazil. They then describe the results of routine studies of 3,000

specimens of faeces from patients in their hospital. Some of these were out-patients, a few came from São Paulo itself but most were from rural areas of the State or from other States. The faeces were examined by direct smears, concentration and sedimentation tests. 73·3% were positive for parasites.

i. Hookworms were found in 51·3%, *Trichuris* in 17·6%, *Strongyloides* in 16·8%, *Ascaris* in 14·5%, *Schistosoma mansoni* in 3·7% and 3 other common species in less than 1%. The observation that hookworms predominated is explained by the fact that most of the patients were from rural areas.

ii. The protozoa found were *Entamoeba coli* in 38·8%, *Endolimax* in 13·6%, *Giardia* in 7·1%, *Iodamoeba* in 3·9%, *E. histolytica* in 1·9% and 3 other species in less than 1%. The low incidence of *E. histolytica* in comparison with other findings in Brazil is attributed to the fact that many of the samples were obtained from out-patients, who did not collect them correctly.

The authors rarely met severe manifestations of amoebiasis and giardiasis, which usually presented with meteorism and constipation rather than with dysentery. *H. J. O'D. Burke-Gaffney*

ENTOMOLOGY AND INSECTICIDES: GENERAL ZOOLOGY

[Papers on the toxic effects of insecticides in man are abstracted in the *Bulletin of Hygiene* under the general heading of Occupational Hygiene.]

United States Dept. of Agriculture. **Mosquitoes of Medical Importance.**

This book was reviewed on p. 650.

Senevet, G. & Rioux, J. *Anopheles* (*Myzomyia*) *hispaniola* Theobald, 1903, simple sous-espèce de *Anopheles* (*Myzomyia*) *cinereus* Theobald, 1901? [**Is** *Anopheles* (*Myzomyia*) *hispaniola* **a Sub-Species of** *A.* (*m.*) *cinereus*?] *Arch. Inst. Pasteur d'Algérie*. 1960, Dec., v. 38, No. 4, 530–35, 1 fig. [18 refs.]

Qutubuddin, M. **The Mosquito Fauna of Kohat-Hangu Valley, West Pakistan.** *Mosquito News*. 1960, Dec., v. 20, No. 4, 355–61. [18 refs.]

The author gives notes on the climate and topography of the area, which lies at 3,000–4,000 ft. near the Pakistan-Afghanistan border and, therefore, according to some authors, near the boundary between the Oriental and Palaearctic zoogeographical regions. As would be expected, the mosquito fauna includes species occurring to various extents in both regions, together with others which are purely Oriental.

Sporozoite rates for *Anopheles culicifacies* ranged from 0 to 1·5% during the period August-November. 65% of resting adults of this species contained human blood, though taken mainly in cattle sheds. *Aedes aegypti* is said to be uncommon. *Aedes* (*Stegomyia*) *w-albus*, interestingly, is "very common". Details are given of variations of markings in this species and in the palps, proboscis and wing of *Culex pipiens fatigans*. It is suggested that *Wuchereria bancrofti* filariasis might be brought into the area from southern India.

P. F. Mattingly

COLLESS, D. H. & CHELLAPAH, W. T. **Effects of Body Weight and Size of Blood-Meal upon Egg Production in *Aëdes aegypti* (Linnaeus) (Diptera, Culicidae).** *Ann. Trop. Med. & Parasit.* 1960, Dec., v. 54, No. 4, 475–82, 2 figs. [13 refs.]

"1. Experiments were designed to investigate effects of body weight and weight of blood ingested on the number of eggs produced by *Aëdes aegypti*. Statistical analysis of the results shows that the two variables are about equally effective for predicting both the number of eggs laid and whether eggs will be laid at all. The relationship of egg production with body weight may be demonstrable only when a range of values is produced by starving the larvae.

"2. The effect of the blood-meal is presumably nutritive, while the apparent effect of body weight is probably largely due to a positive correlation between this variable and the number of oocysts in the ovaries. Such a correlation was found to occur in mosquitoes from two different colonies.

"3. It is possible that stored food reserves contribute something, though relatively little, to the effect of body weight. It is also suggested that some 'vitality' factor plays a part, particularly as regards the qualitative distinction between layers and non-layers."

CRAIG, G. B., Jr., HICKEY, W. A. & VANDEHEY, R. C. **An Inherited Male-Producing Factor in *Aedes aegypti*.** *Science*. 1960, Dec. 23, v. 132, 1887–9.

By determining the sex ratio of the offspring of single pair matings from a strain of *Aedes aegypti* from Texas, a strain has been selected in which the average percentage of males is 77·5. Crossing the females of this male-producing line with males from a strain in which the sex ratio is 1:1 (from Key West) produced an F_1 generation showing equal numbers of males and females. The reciprocal cross (Key West female by Texas male), on the other hand, showed a high male ratio in the progeny. This and other evidence indicates an inherited male-producing factor (called MP) which is transmitted only by males.

The counting of eggs laid and number of progeny reared shows that selective mortality of the sexes is not responsible for the differing sex proportions. The exact cause remains to be investigated; abnormal spermatogenesis or competition of sperm during fertilization are suggested as possibilities. The authors suggest that the mass release of male-producing males might serve as a method of control of this species.

G. Davidson

i. BAR-ZEEV, M. **The Reaction of Mosquitoes to Moisture and High Humidity.** *Entomologia Exper. et Applicata.* Amsterdam. 1960, Oct., v. 3, No. 3, 198–211, 1 fig. [34 refs.]

ii. ——. **The Location of Hygroreceptors and Moisture Receptors in *Aedes aegypti* (L.).** *Ibid.*, 251–6. [20 refs.]

i. Previous attempts to gauge the relative attractiveness to mosquitoes of moist or dry conditions have given contradictory results because, technical differences apart, the small proportion of mosquitoes actually responding probably represented physiologically biased samples. In the present work 12 female *Aedes aegypti* (the only species tested) were compelled to make a choice by being enclosed in a Petri dish of 15 cm. diameter and 2 cm. deep, covered with mosquito gauze. A diametral waterproof strip separated alternative substrates of wet and dry filter-papers on the floor of the dish. Actual contact between the mosquitoes and substrate could be prevented by a stainless steel mesh disc. The Petri dish was surrounded by a carefully controlled atmosphere.

The difference between the number of the mosquitoes counted on or over each paper expressed as a percentage of the total on or over both papers gave a measure of the intensity of the response.

At 26°C. normal non-gravid females were attracted to the dry side, but more strongly at 95% RH than at 25% RH. At 61% RH the response was intermediate, but extremes of temperature, 18°C. and 35°C. at this humidity caused a slightly lower response. The small difference in temperature between the wet and dry sides due to evaporation was shown to be an insignificant factor. Where the steel screen prevented contact with the papers, attraction to the dry side was less strong, and was still weaker if a salt solution, giving a lower humidity, was used instead of water to moisten the filter paper.

Desiccated mosquitoes ceased to avoid the wet side after a 3% water loss and were positively attracted after further dehydration.

The response of gravid mosquitoes was less marked, but the moist surface was still avoided. An experiment showed that gravid mosquitoes did not begin oviposition sooner when desiccated. It was concluded that the attraction of gravid mosquitoes to water must depend on the attainment of a physiological state of " egg-laying ".

It was also observed that mosquitoes refused to bite wet skin, controls feeding readily on dry skin. [There is however no record of relevant temperatures or humidities.]

After some further observations it is concluded that the choice between moist and dry conditions involves a taxis rather than a kinesis type of orientation.

ii. In the second paper the same methods and apparatus were used to compare the reactions of the intact mosquito with those of which the antennae, palps and tarsi were removed or covered with silicon grease or a wax. The response of tarsectomized females was anomalous, but otherwise covering or removing the antennae, or covering the tarsi resulted in a reduced response to moisture. The covering of both antennae and tarsi, or, when contact with the papers was prevented by the steel mesh, the antennae alone, resulted in the loss of all response. The results are complicated by the observation that covering the antennae reduces relative activity though to a lesser degree than antennectomy. It is concluded that the antennae are the sites of hygroreceptors and

the tarsi the sites of moisture receptors. The palps appear to play no significant part in moisture perception. [Surprisingly, no trials on females with covered tarsi over the steel mesh are reported. These would test the hypothesis of functional differentiation of receptors in the antennae and tarsi in view of the effect of the antennae on general activity.] *G. A. H. McClelland*

CHATTORAJ, A. N. & BROWN, A. W. A. **Internal DDE Production by Normal and DDT-Resistant Larvae of** *Aedes aegypti*. *J. Econom. Entom.* 1960, Dec., v. 53, No. 6, 1049–51. [11 refs.]

The larvae of several strains of *Aedes aegypti* were exposed to 1 p.p.m. DDT for 24 hours and the internal amounts of DDT and DDE estimated colorimetrically, by the method of Schechter-Haller. The DDE-production of three susceptible strains was about one-sixth that of three resistant strains and was roughly proportional to the duration and degree of survival. These three resistant strains were a DDT-resistant strain from Trinidad, a DDT- and dieldrin-resistant strain from Puerto Rico and a malathion-resistant strain developed by malathion pressure from a strain from Penang, Malaya. A comparison of a susceptible (though tolerant) strain from Penang with strains in which the DDT-susceptibility levels had been varied by selection or relaxation of pressure, showed little correlation between DDT resistance and DDE content. Laboratory-induced resistance in this Penang strain is thus probably related to causes other than DDE production. *G. Davidson*

WEBBE, G. **The Susceptibility of Fourth-Stage Larvae of** *Anopheles gambiae, Aëdes aegypti* **and** *Culex pipiens fatigans* **to some Phosphoric Acid Esters.** *Ann. Trop. Med. & Parasit.* 1960, Dec., v. 54, No. 4, 471–4.

"1. The susceptibility was tested of 4th-stage larvae of *Anopheles gambiae, Aëdes aegypti* and *Culex pipiens fatigans* to some phosphoric acid esters.

"2. Technical preparations of Baytex, methyl parathion and chlorthion were used to prepare acetone-water suspensions for the tests.

"3. The use of minimum lethal dose as a measure of toxicity was retained in the investigation.

"4. The 48-hour minimum lethal doses of the compounds to *An. gambiae* were about 0·005 p.p.m. for Baytex and methyl parathion and 0·025 p.p.m. for chlorthion; to *Ae. aegypti*, about 0·015 p.p.m. for Baytex and methyl parathion and 0·03 p.p.m. for chlorthion; to *C. fatigans* about 0·0025 p.p.m. for Baytex, 0·005 p.p.m. for methyl parathion and 0·01 p.p.m. for chlorthion.

"5. Comparison of the toxicities of Baytex and methyl parathion with those of DDT and dieldrin for *An. gambiae* shows that the species is twice as susceptible to the organo-phosphorus compounds as to dieldrin and 12 times as susceptible as to DDT."

LIEN, J. C. **Laboratory Culture of** *Aedes* (*Finlaya*) *togoi* **(Theobald), 1907 and Measurements of its Susceptibility to Insecticides.** *Entomologia Exper. et Applicata.* Amsterdam. 1960, Dec., v. 3, No. 4, 267–82, 2 figs. [26 refs.]

Aedes togoi occurs on the coastal fringe and islands of eastern Asia, from Siberia to Taiwan (Formosa). It occasionally acts as a vector for filarial disease

and is sometimes a nuisance because of its bites. Eggs from Taiwan were brought to London in 1958 and a laboratory colony started, by methods similar to those commonly employed for *A. aegypti*. The colony was maintained at 27°C. throughout, with natural light during the day. It was found that the eggs required about 4 days in a humid chamber to complete embryonic development before they would hatch when soaked in water for 24 hours. After the completion of development, the eggs could be stored dry for 15 days, but after a month or more hatching was unsatisfactory.

The larvae were reared in water to which small quantities of a "yeast-Bemax" mixture was added (Bemax is stabilized wheat germ plus protein and mineral). Development to 4th stage occurred on the 7th day; pupation from 10th to 16th; emergence from 12th to 19th. The males tended to emerge first and sex ratios were about 50:50.

Like *A. aegypti, A. togoi* will mate satisfactorily in quite small cages. The smallest one tested was 19 cm. cube; and in this nearly 100% of females were fertilized within 2 weeks. Autogenous egg development occurred in most of the females if they were denied blood; this somewhat complicated the observations of the normal ovipositions after blood meals. Females prevented from mating laid eggs, but these were infertile.

Eggs were laid on filter paper dampened with water or 16% sugar solution, but scarcely at all on paper with 2% or 5% salt solution. The salt solution, up to 5%, did not prevent larval development; but it increased mortality and delayed pupation. Above 5%, mortality due to the salt rose and 10% was lethal to all within 72 hours.

Measurements of susceptibility to insecticides were made with both larvae and adults, by means of the standard WHO test methods. Comparative tests were made with *A. aegypti* colonies originating in Taiwan and the Pescadores Islands. The adult *A. togoi* were of the same order of susceptibility to DDT as normal *A. aegypti*. The larvae of *A. togoi* were distinctly less susceptible to DDT, but about the same to BHC and dieldrin as the *A. aegypti*.

J. R. Busvine

LEWALLEN, L. L. **On the Stability of Insecticide-Resistance in Mosquitoes.** *J. Econom. Entom.* 1960, Dec., v. 53, No. 6, 1122–4. [10 refs.]

The author reviews some of the records concerning the stability of resistance to chlorinated hydrocarbon insecticides in mosquitoes and comes to the conclusion that DDT resistance in particular shows a tendency to decline in the absence of selection.

Records of levels of resistance to malathion in *Culex tarsalis* and to parathion in *Aedes nigromaculis*, made at intervals on samples of these species taken from the field where these insecticides have been used for their control, show that organo-phosphorous resistance in mosquitoes is far from stable and reversion to susceptibility may occur rapidly when selection pressure is relaxed or removed.

Rotation of insecticides and avoidance of the prolonged and frequent use of any one insecticide are advocated as a solution to the resistance problem.

G. Davidson

DOUCET, J. Moustiques forestiers de la République de Côte-d'Ivoire. I. Notes biologiques et systématiques sur *Uranotaenia henrardi* Edwards, *Eretmapodites oedipodius marcellei* Hamon, *Aedes* (*Pseudarmigeres*) *kummi* Edwards et *Aedes* (*Pseudarmigeres*) *argenteoventralis* Theobald. [**Forest Mosquitoes of the Ivory Coast. I. Biological and Systematic Observations on** *Uranotaenia henrardi, Eretmapodites oedipodius marcelleae, Aedes kummi* **and** *Aedes argenteoventralis*] *Bull. Soc. Path. Exot.* 1960, Sept.–Oct., v. 53, No. 5, 810–14, 1 fig. II. Note préliminaire sur l'échelonnement vertical de la faune culicidienne de la forêt du Banco (Abidjan). [**II. Preliminary Observation on the Vertical Distribution of the Mosquito Fauna of the Banco Forest, Abidjan**] *Ibid.*, 814–19.

See also p. 722, LAURENCE, **The Biology of Two Species of Mosquito** *Mansonia africana* **(Theobald) and** *Mansonia uniformis* **(Theobald), belonging to the Subgenus** *Mansonioides* **(Diptera, Culicidae).**

RUBTZOV, I. A. [**Diptera. Vol. VI, Pt. 6. Simuliidae** (of USSR).] [In Russian.] 2nd Edition. Fauna SSSR n.s. No. 64. 860 pp., 424 figs. 1956. Moscow: Zool. Inst. Akad. Nauk. SSSR. [51 rub. 20 kop.]

The first 65 pages of this book include accounts of the external and internal structure of the adults and larvae of Simuliidae, and a description of the pupa and its cocoon. The section on the biology of adult black-flies occupies 19 pages and includes a discussion of blood-sucking habits. The great majority of species have mouth parts suitable for sucking blood, and dozens of these species are to be found as larvae and pupae whereas usually only two or three are seen as adults in the proximity of man or animals. This cannot be explained by supposing that most species bite wild mammals or birds, because simuliids with mouth parts suitable for sucking blood are to be found in large numbers in places where warm-blooded animals are unknown. Man-biting species tend to bite cattle, horses and birds as well, but there is some evidence of preference for a particular host. Blood-sucking habits within a single species are said to vary according to the condition of development of the larvae, and there can be relatively sharp distinctions in a relatively small area. Variations in biting activity in an area may be unrelated to the number of black-flies present. Mountain and forest streams may produce many black-flies but few blood-suckers.

The practical importance of Simuliidae is discussed, and distribution maps show the occurrence of certain species-groups in some tropical areas, namely India, Pakistan, Malaya, Central America and the north-western part of South America. In the systematic section, which occupies more than three-quarters of the book, is a drawing of a pupa of *Odagmia ephemerophila* attached to a may-fly larva. Africa is the only other part of the world where simuliid pupae (including *Simulium neavei*) have been found attached to other animals.

D. J. Lewis

RUBTZOV, I. A. **Simuliidae (Melusinidae). Die Fliegen der Palaearktischen Region.** [Simuliidae of the Palaearctic Region] Vol. III. 14. Lieferung 203, 1959, pp. 1–48; Lief. 206, 1959, pp. 49–96; Lief. 211, 1960, pp. 97–160. Stuttgart: Schweizerbart'sche Verlagsbuchhandlung.

The author has written a large book in Russian on the Palaearctic Simuliidae [see above] and now an account of the subject in German is appearing in a series of consecutive parts. The 3 now available contain much general information of interest to workers outside the Palaearctic Region. In the introduction the number of species now known is given as more than 1,000. Anatomy and morphology occupy 36 pages and are followed by a section on biology in which phenology and related subjects, nutrition and the first page on blood-sucking habits complete *Lieferung*, or instalment, number 203. Among subjects considered in *Lieferung* 206 are the biology of the early stages, migrations, natural enemies, medical and veterinary importance, the relation of the Palaearctic black-fly fauna to that of other regions, and distribution. *Lieferung* 211 deals with classification (just begun in the previous issue), identification, variability, collecting and preserving specimens, personal protection and control; and the last 43 pages comprise the first of a series of identification keys and descriptions of species, and include text-figures 34 to 56. *D. J. Lewis*

CROSSKEY, R. W. **A Taxonomic Study of the Larvae of West African Simuliidae (Diptera: Nematocera) with Comments on the Morphology of the Larval Black-Fly Head.** *Bull. Brit. Mus. (Nat. Hist.).* 1960, v. 10, No. 1, 1–74, 194 figs. [61 refs.]

The structure of mature or semi-mature larvae, which are probably in the 6th instar, is described, and one of the characters used for identification is the hypostomium which has often been called the submentum. Larval characters provide no evidence that the pupal forms of black-flies [this *Bulletin*, 1954, v. 51, 323] should be regarded as species. Keys are given for the species-groups of Simuliidae of the Ethiopian Region and for the 21 species which occur in West Africa west of the Adamawa mountain massif. A description of the larva of each species is accompanied by a record of the material examined and a note on the larval habitat and the range of the species. *Simulium damnosum* is widely distributed and extends into the drier territories.

This paper will aid ecological studies because it is often impossible to find pupae for identification. *D. J. Lewis*

BROWN, A. W. A., MCKINLEY, D. J., BEDFORD, H. W. & QUTUBUDDIN, M. **Insecticidal Operations against Chironomid Midges along the Blue Nile.** *Bull. Entom. Res.* 1961, Jan., v. 51, Pt. 4, 789–801, 6 figs.

Chironomid midges, particularly *Tanytarsus lewisi*, breed in the Blue Nile and the adults are an important pest at Khartoum in the winter [this *Bulletin*, 1956, v. 53, 1283]. Chironomid larvae are known to rise from the river bed towards the surface about sunset and are presumed to travel with the current during the night. Breeding evidently ceases when the river rises at the end of

June, but a few larvae of a species of *Tanytarsus* were found in the Sennar reservoir and an irrigation canal during July.

Populations of adult midges were sampled with light traps at Khartoum, floating larvae and pupae were collected with a plankton net at Khartoum, Wad Medani (about 90 miles up-river), Sennar (150 miles up-river) and Maiurno (above the Sennar dam), and larvae in the mud were sampled with a Peterson grab-dredge. Records were kept of larvae considered to be *T. lewisi* and pupae considered to be *Tanytarsus*.

Tests were made of 4 methods of applying insecticide; DDT was sprayed from the ground and the air along the river-side area of Khartoum, DDT was sprayed from aircraft on the river 10 miles above Khartoum, and DDD was sprayed on three sections of the Sennar reservoir. A total of 450 lb. of DDT, dissolved in a mixture of an aromatic oil, kerosene and Lissapol detergent, was applied to the river above Khartoum, but no effect on the midges was observed, and some fish were killed. Spraying the river-side area produced temporary local control.

DDD was chosen for use above Sennar, partly to avoid killing fish, and a total of 500 lb. was applied in the form of an aqueous suspension of a wettable powder. Observations on larvae and pupae indicated that local control was achieved, but decisive results were not obtained at Wad Medani in the same season. During the next season, however, early stages were difficult to find at Wad Medani and remarkably few larvae, pupae and adults were found at Khartoum, but it was not possible to ascertain how far this was due to natural fluctuations. It is suggested that control above Sennar, by reducing the number of egg-laying females, produced a delayed effect on the numbers of chironomids downstream.

[The authors have added to our knowledge of the bionomics of the chironomids, demonstrated a method of control which may prove useful in future years, and emphasized the scale and difficulty of the problem. In complexity it is comparable with some of the better known problems of medical entomology, but the chironomid problem on the Nile appears to be unique and can only be fully understood as a result of extensive further local investigations. Such investigations, on larval taxonomy and bionomics, the action of insecticides on various species at various depths, and many other topics, would doubtless prove costly but might lead to an economic method of certain complete control.]

D. J. Lewis

ADAM, J. P. & ABONNENC, E. Sur *Phlebotomus renauxi* Parrot et Schwetz, 1937. Description du mâle. [**Description of the Male** *Phlebotomus renauxi*] *Arch. Inst. Pasteur d'Algérie*. 1960, Dec., v. 38, No. 4, 527–9, 1 fig.

JOHNSON, Phyllis T. **Autogeny in Panamanian *Phlebotomus* Sandflies (Diptera: Psychodidae).** *Ann. Entom. Soc. of America*. 1961, Jan., v. 54, No. 1, 116–18.

Nine autogenous "strains" of *Phlebotomus gomezi* have been maintained at the Gorgas Memorial Laboratory, Panama, as well as a normal "strain" which requires a blood meal before ovary development is possible. These

colonies were obtained from wild-caught females that deposited eggs in large moistened plaster lined vials. The larvae were reared on autoclaved, dried and ground rabbit faeces which had been soaked in human blood, or on an autoclaved mixture of ground rabbit faeces, decaying forest leaves and dried insects.

Autogenous females will feed on blood, but are normally fed on boiled raisins. The fat body of autogenous females is well developed at the time of emergence, whereas normal females have a poorly developed fat body. Autogenous females produced from 4 to 22 eggs which hatched from 8 to 14 days later, compared with a range of 1 to 70 (usually 15 to 40) eggs per normal female which hatched mainly (81%) after 6 to 8 days.

Attempts to cross an autogenous strain with a normal strain have not been successful. Reciprocal crosses at both the seventh and ninth laboratory generations have produced only infertile eggs. Mating has not been observed in even the normal colonies and in these colonies few females were found with sperms in the spermathecae.

Out of 113 females captured taking a blood meal in the field, 5 females produced autogenous offspring. *B. R. Laurence*

SAWICKI, R. M. **A Technique for the Topical Application of Poisons to Non-Anaesthetised House-Flies for Knockdown Assessments.** *Bull. Entom. Res.* 1961, Jan., v. 51, Pt. 4, 715–22, 2 figs. [11 refs.]

Batches of flies are sucked through a funnel-shaped aperture from a special contractible cage on to a suction pad fitted on the hose from a vacuum cleaner. The insects, immobilized by suction, are sexed, the males discarded and the females dosed with 0·125 μl. drops from a micro-application syringe. Batches of about 10 flies can be treated in 5 to 7 seconds. Afterwards they are readily transferred to clean 4 × 1½ in. glass tubes and confined by the gauze from the suction pad. They are later examined for paralysis or kill, as desired. The manipulation apparently does not harm the flies and results of tests of knock-down time are satisfactorily repeatable. *J. R. Busvine*

ABBASSIAN-LINTZEN, Rosemarie. **Tabanidae (Diptera) of Iran. IV. Horseflies from the Demavend District in the Elburz Mountains.** *Bull. Soc. Path. Exot.* 1960, Sept.–Oct., v. 53, No. 5, 819–24, 1 fig. **V. Descriptions of Three New Subspecies of the Genus** *Haematopota. Ibid.*, 824–8.

WYSS-HUBER, M., STRIEBEL, H., WEISS, E. & GEIGY, R. Papier chromatographischer Nachweis verschiedener Zucker und spektro-photometrische Bestimmung des Glykogens in Extrakten von Glossinen, Reduviiden und *Ornithodorus moubata.* [**Paper Chromatographic Identification of Different Sugars and Spectrophotometric Estimation of Glycogen in Extracts of** *Glossina,* **Reduviids and** *Ornithodoros moubata*] *Acta Tropica.* Basle. 1961, v. 18, No. 1, 46–57. [11 refs.]

ROBERTS, F. H. S. **A Systematic Study of the Australian Species of the Genus *Ixodes* (Acarina: Ixodidae).** *Australian J. Zool.* 1960, Dec., v. 8, No. 3, 392–485, 41 figs. [Numerous refs.]

BENJAMINI, E., FEINGOLD, B. F. & KARTMAN, L. **Allergy to Flea Bites. III. The Experimental Induction of Flea Bite Sensitivity in Guinea Pigs by Exposure to Flea Bites and by Antigen Prepared from Whole Flea Extracts of *Ctenocephalides felis felis*.** *Exper. Parasit.* New York. 1960, Oct., v. 10, No. 2, 214–22, 5 figs.

[For previous paper in this series see HUDSON *et al.*, this *Bulletin*, 1961, v. 58, 146.]

Guineapigs were sensitized to bites of *Ctenocephalides felis* by daily exposure to bites from batches of these fleas. Sensitization was independent of the number of fleas used over a wide range (2 to 300), though with less than 5 fleas per batch rather fewer animals responded. The first reactions to the bites occurred after about 5–7 days in most animals and consisted in a delayed response (erythema and induration) 24 hours after the bites. Most animals also showed an immediate temporary reaction (oedema and erythema) as well, which usually began after 6–8 daily exposures. These two reactions possibly correspond to similar stages in sensitization of man to mosquito bites [*cf.* MELLANBY, *ibid.*, 1947, v. 44, 240; also MCKIEL, *ibid.*, 1959, v. 56, 1285]. However, the later stages of desensitization (when first the delayed, and later the immediate, reactions cease to occur) were not shown by the guineapigs. The authors are cautious about comparisons with human sensitization.

Extracts of whole ground fleas were obtained in various ways (described in detail). When daily injected intradermally, these extracts produced sensitization after 10–14 days. Animals sensitized in this way also reacted characteristically on the first occasion they were challenged by flea bites. Conversely, animals sensitized by daily flea bites reacted to the injection of flea extract, though not so markedly.

Sensitization appears to be a true allergy and is systemic; *i.e.* guineapigs sensitized in one part of the body reacted to challenges given in other regions.

J. R. Busvine

See also p. 743, MANN & BATES, **The Pathology of Insect Bites: a Brief Review and Report of Eleven Fatal Cases.**

CLASTRIER, J. Notes sur les Cératopogonidés. XI. Cératopogonidés de la République du Congo (3). [**Notes on Ceratopogonids. XI. Ceratopogonids of the Congo Republic**] *Arch. Inst. Pasteur d'Algerie*. 1960, Dec., v. 38, No. 4, 510–26, 9 figs. [15 refs.]

ARMSTRONG, J. A. & BRANSBY-WILLIAMS, W. R. **Observations on the World Health Organization Adult Test Kit for Bioassay of Insecticide Deposits on Wall Surfaces.** *Mosquito News*. 1960, Sept., v. 20, No. 3, 297–305, 3 figs. [11 refs.]

At the request of the World Health Organization, the authors studied the merits and faults of two bioassay test kits. The one kit consisted of a conical

exposure chamber and the other was a Petri dish mounted on a plastic base with a removable shutter between the base and the dish. [These two devices are described in the WHO Technical Report Series No. 153, 1958, this *Bulletin*, 1959, v. 56, 491.]

A specially constructed wall was used for the majority of the bioassays. The wall was built around the inside of a circular aluminium house at Arusha, Tanganyika. Half the wall was coated with half an inch of sorptive mud and the other half with half an inch of non-sorptive mud. Panels on the wall were carefully sprayed with either DDT or dieldrin at 2·0 mgm./metre^2 and 0·5 mgm./metre^2, respectively. Some experiments were also done in African houses.

Laboratory-reared female *Anopheles gambiae* and *Aedes aegypti* were exposed to treated surfaces for 30 or 60 minutes and were then held in clean cages under controlled conditions for 24 hours, after which mortality counts were made.

The results presented indicate little difference in the performance of the two types of exposure chamber. Both devices were equally good in demonstrating the aging of insecticide deposits and were also sufficiently accurate to reflect differences in mortality when mosquitoes were exposed to dieldrin on sorptive and non-sorptive surfaces. The effect of changes in humidity on the potency of the insecticide was also detected by the test kits. However, considerable variation in mortality was obtained between replicate exposures. Indeed, the standard deviation was often greater than the mean mortality. The high variance is attributed to the small (average 15) number of insects per replicate and exposure periods of too short duration.

In the field it was found that the conical chamber was better suited to work on irregular surfaces—even thatch. The dish apparatus was conveniently handled on smooth surfaces.

This article appears to be a digest of a WHO working paper (Armstrong and Bransby-Williams, *WHO Expert Committee on Insecticides, Working Paper No.* 10, Add. 1), which should be consulted for the detailed results.

B. C. Fine

Rickenbach, A., Chartol, A., Escudie, A. & Ricosse, J. Le D.D.T. et sa rémanence dans la zone pilote de Bobo-Dioulasso. **[DDT and its Residual Effect in the Pilot Zone of Bobo-Dioulasso, Upper Volta, West Africa]** *Méd. Trop.* Marseilles. 1960, Nov.–Dec., v. 20, No. 6, 699–721, 14 graphs. [19 refs.]

The first part of the paper describes the technique by which chemical estimations were made of DDT residues on walls of sprayed huts. This was a method described by Alessandrini [this *Bulletin*, 1956, v. 53, 821] in which a silicone lubricant is smeared over paper and this, pressed against the wall, picks up the deposit.

The biological method of assessing insecticidal potency of the residues is described in Section 2. This is the method advocated by the WHO, in which mosquitoes are confined on the treated surface under plastic cones, for standard periods, and later kept for mortality or recovery. *Anopheles gambiae* females, reared from larvae, were used.

The experiments were done in 6 villages in the locality; but complete data were available for 4 only, and most of the graphs and the conclusions are based on these. Most of the huts had been sprayed with DDT once a year.

The results are discussed in relation to the adsorption and diffusion of DDT in mud (described, in many papers, by HADAWAY and BARLOW). These movements of the insecticide, which affect its availability, are related to local humidity and rainfall.

The superficial deposit of DDT was high on non-porous surfaces and was lost rapidly if exposed to sun, but fell off gradually inside the huts. On porous surfaces the loss inside the huts was also gradual and showed a rise during the humid rainy period.

The kills of mosquitoes in the WHO test (½-hour exposure) showed a decline followed by sharp rises during the rainy season. The mortality curves followed the rainfall chart very closely and the effect appeared to be not solely due to humidity but to actual dampening of the walls by rain.

The authors point out that the sorption of DDT by mud walls is not without benefit, since it keeps a reservoir available for emergence during the vital rainy season; and this reservoir cannot be dislodged or destroyed by smoke. Only fine crystalline suspensions can be effectively absorbed. *J. R. Busvine*

REID, E. T. **Insecticide Resistance.** *Central African J. of Med.* 1960, Dec., v. 6, No. 12, 528–34, 3 figs.

This article reviews, in its simplest form, modern thought on the subject of resistance in insects to insecticides. The problem as it relates to the major insect pests of medical importance in Southern Rhodesia is discussed briefly, with examples from the field. *G. Davidson*

MISCELLANEOUS PAPERS

VAN LOGHEM, J. T. **Sickness and Death in the Primitive World especially in New Guinea.** *Trop. & Geograph. Med.* Amsterdam. 1960, Sept., v. 12, No. 3, 196–207, 1 map & 3 figs.

In recent years much interest has been taken in the beliefs which primitive peoples hold about the nature and causation of disease. In this present paper the author writes about Netherlands New Guinea, but his general theme could apply much more widely. Even though the educated members of these primitive communities accept Western teaching about causation—for instance that typhoid fever is due to the typhoid bacillus—this bare generality does not answer the question they ask, which is why has this patient in particular become ill, and what is it that led him to run the risk of infection—or accident—at that particular time? The answer is evil influence or intention on the part of some other person, often through the medium of a witch.

This and similar beliefs are most strongly entrenched in the popular culture;

they are extremely difficult to eradicate, and they have led to countless procedures—usually bound up with magic—for detecting the offending persons, who are punished and may even be killed. Western law, which forbids such killing, is therefore held responsible for disease and accident brought about by unpunished witches. These witches may operate by obtaining some excretion of an intended victim, and this notion renders the people suspicious of attempts to alter their traditional customs relating to defaecation.

The author brings out the point that people who hold these beliefs do not necessarily refuse Western medicine; they do not think that it covers the whole situation. He has contributed an interesting paper on an important subject.

Charles Wilcocks

BULL, G. M. **Impressions of a Medical Tour of the Eastern and Western Regions of Nigeria.** *West African Med. J.* 1960, Aug., v. 9 (n.s.), No. 4, 139–44.

It is surprising to read, from a Professor of Medicine, such a remark as "In Nigeria, I am convinced, the expenditure should be mainly in the field of public health. Curative medicine is a luxury which at present must be dispensed very sparingly". It is perhaps even more surprising to read, from any medical man, that "The first priority should, therefore, be to increase the national income by improving communications, education and agriculture and expanding industry, mineral exploration and so forth. For many years the expenditure on health should be kept at a minimum lest it delay these other more important developments.

"In Britain the life expectancy of all ages has improved remarkably in the last century. This is not due to curative medicine, but to the public health revolution which took place in the second half of the last century. Clean water supplies, adequate drains, improvements in housing and diet, and not penicillin or hospitals, are responsible for this change." And so, the author argues, it should be for Nigeria. But most doctors in Nigeria have qualified in Britain, where the training syllabus does not stress the importance or interest of public health, and "British and American medical schools do not provide a suitable curriculum for doctors who are to work in Nigeria and other tropical countries".

This, and some hints on the better organization of work in the out-patient departments of Nigerian hospitals, is the theme of this short paper, written as a result of a tour which lasted about 3 months. The author acknowledges the strength of the political pressures which favour expenditure on treatment. His general argument, though perhaps rather extreme, seems to the reviewer to be irrefutable, but the pressures in favour of curative medicine may be more formidable—from the general public and from medical men—than he thinks, and more reasonable. But there is little doubt that a shift in emphasis such as he advocates would be enormously rewarding.

Two letters in a later issue of the same journal criticize Professor Bull. D. MAKAY (*West African Med. J.*, 1961, v. 10, 64) contends that "we are doctors first, responding to the cry of anguish of a man in pain before we respond to the demand of the statistical table", an attitude which, as Bull suggests in reply, may obstruct effort to reduce infant mortality. "I am more

distressed by a mortality of 480 per 1,000 in children than I am at my inability to bring comfort to a single patient."

S. L. ADESUYI (*ibid.*, 64–65) argues that the curative services obviously must be maintained—the sick must be cared for and, moreover, the curative services stimulate that cooperation from the public which is essential to the preventive services. The two should develop side by side. *Charles Wilcocks*

GEAR, H. S. **Medicine and the New Africa. The Passing of Colonialism South of the Sahara.** *Lancet.* 1960, Nov. 5, 1020–23.

This paper is based on a lecture given under the auspices of the Institute for the Study of Man in Africa, Johannesburg. The author comments on the origins of medical care in Africa, for which at first private practitioners were largely responsible, and goes on to pay a tribute to the organized medical departments of the governing powers. He makes the important point that medicine only achieves results if there is an adequate community with law and order, efficient civil administration, good communications, and a sound economy.

He gives a few paragraphs to United Nations aid, to other governmental arrangements, and to non-governmental influences, noting that there is a danger that the charlatan—who may be a qualified practitioner or a witch doctor—may do immense harm by playing on the credulity of the Africans. The social patterns largely determine the disease patterns, and these are changing rapidly and extensively in Africa. Efficient medicine depends on efficient administration, but equally it depends on the integrity and principles of the doctors and their assistants, who will carry the medical future. *Charles Wilcocks*

FRAGA DE AZEVEDO, J. Problemas prementes da investigação medica nos territórios africanos. [**Pressing Problems of Medical Research in African Territories**] Reprinted from *Rev. Méd. Angola.* 1960, No. 6, 53–9.

LOWENSTEIN, F. W. **Blood-Pressure in relation to Age and Sex in the Tropics and Subtropics. A Review of the Literature and an Investigation in Two Tribes of Brazil Indians.** *Lancet.* 1961, Feb. 18, 389–92, 2 figs. [29 refs.]

The author first reviews published papers dealing with measurements of blood pressure in the tropics and sub-tropics in respect to the questions (1) Does blood pressure rise with age? (2) Are there any sex differences? In 26 groups examined 12 showed a rise with age in both sexes, 4 showed a rise in women and not in men, 5 showed no rise in either sex, while in 5 studies of men only 4 showed a rise and 1 did not. In the groups where pressures were higher in the male the difference tended to decrease after the age of 45. In the groups which showed higher pressures in the females the differences only became significant after the age of 40.

He next gives his results in a study of two tribes of Brazilian Indians living in the tropical Amazon basin: the Mundurucús and the Carajas. The blood pressure readings were low throughout life in both these tribes, while the men

showed a significantly higher systolic pressure than the women. In the Mundurucú tribe the mean blood pressure varied from 104·7/66·6 in the male and 92/59·9 in the female at the ages of 16–20 years to 132·8/77·2 in the male and 106·7/70 in the female at the ages of 51–60. In the Caraja tribe the mean blood pressure varied from 109·5/72·5 in the male and 96/69 in the female aged 16–20 years to 110·3/69·7 in the male and 108/64·7 in the female aged 51–60 years. The rise of the systolic and diastolic pressures of the male Mundurucús is statistically significant, while the rise among the females, though present, is not. There was no rise in either sex among the Carajas.

The Mundurucús differ from the Carajas in that they have been more influenced by civilization. They have become Roman Catholics and live under mission influence, while the Carajas are still pagan both in religion and social organization. In addition the Mundurucús consume table salt (sodium chloride) while the Carajas use plant ashes (potassium chloride). *A. C. E. Cole*

WADSWORTH, G. R. **The Height, Weight and Blood Pressure of Healthy African Men on a Known Dietary Intake.** *East African Med. J.* 1960, Nov., v. 37, No. 11, 709–14.

During an investigation of the feeding of Kikuyu political detainees in Kenya in 1956, the body weights of 1,880 adult males were recorded once a month on four separate occasions, and their heights were measured. The men's energy expenditure was minimal; their diet, based on a staple of maize meal, supplied 2,324 calories, 84·1 gm. protein, 33·3 gm. fat and 425 gm. carbohydrate. The mean height was 65·2 in. ± 0·067, mean weights of different groups, which are given in tables, varied from 123·0 lb. ± 0·535 to 127·5 lb. ± 0·613. The highest weights were recorded in March when the environmental temperature was maximal.

The findings are compared with previous observations in Kenya, and with a group of English men. The weight/height ratio (34·2 kgm./metre) is higher than that observed in Kikuyu in 1931 [this *Bulletin*, 1932, v. 29, 233] (31·7 kgm./metre), and in uneducated Kikuyu in 1931 [*Bull. Hyg.*, 1938, v. 13, 61] (33·5 kgm./metre), approximating more closely with that of meat-eating Masai (35·4 kgm./metre), 30 educated Kikuyu (37·7 kgm./metre) and the group of 460 English men (35·6 kgm./metre).

In places where food supplies are probably insufficient, the estimation of the calorie needs of a population should be based upon expected optimal body weight, rather than on the actual weight. It is concluded that the Kikuyu seen in the camp were receiving a higher intake in relation to their energy expenditure than those living free, and that these measurements of them could provide an optimal basis for calculating food requirements for the community.

Blood pressures were recorded on 3 occasions in the same men. The author has noted both here and in Singapore that there is a progressive fall in recorded blood pressure when this is measured on different occasions, the minimal level being reached on the third occasion of measurement. In three groups, the third readings gave mean blood pressures of 114/73, a fourth group in which the diet had been supplemented with nicotinic acid gave a significantly lower pressure of 105/68 on the third occasion. These findings are discussed and compared with observations of blood pressures in other communities. *T. P. Eddy*

SYMON, S. A. **Notes on the Preparation and Uses of African Medicines in the Mankoya District, Northern Rhodesia.** *Rhodes-Livingstone Communication No. 15.* 1959, 21–67. Lusaka: The Rhodes-Livingstone Institute.

REPORTS AND SURVEYS

LISBON. **Proceedings of the Sixth International Congresses on Tropical Medicine and Malaria, Sept. 5–13, 1958. Vols. I & II.** *Anais Inst. Med. Trop.* Lisbon. 1959, v. 16, Suppls. No. 5 & 6, 328 & 661 pp., numerous illustrations. [Numerous refs.]

The volume of abstracts of papers presented at the Sixth International Congresses on Tropical Medicine and Malaria (1958) was reviewed in this *Bulletin*, 1959, v. 56, 249. The Instituto de Medicina Tropical has now issued the first 2 volumes of the full Proceedings.

Volume I is introductory, and contains accounts of the inauguration ceremony and the plenary sessions, the banquet, the social events, the general programme, the films and exhibitions, the list of participants, and a financial statement. This volume is illustrated by many photographs of groups of participants at scientific meetings or on the social occasions. It is a pleasant reminder of a beautiful city.

Volume II contains the papers presented in Division A, Tropical Medicine; Section 1, Helminthic Infections. The main groups here are schistosomiasis, filariasis, and a few miscellaneous papers on other worm infections. The papers are printed in full, and occasionally the discussions they provoked are reproduced. Most of the papers are in the English language, but some are in Portuguese, French or Spanish.

It is not possible to give an adequate account of the papers included in this large volume; the subject matter ranged widely, over old and new work and ideas, and from the broad epidemiological approach with its social implications to the most detailed experimental work. The papers should be read in full. Later volumes, to cover the other Divisions and Sections, will presumably be published later.

The printing, as usual with publications from the Instituto de Medicina Tropical (now housed in a magnificent new building which was used for the first time by the Congresses) is excellent, and the editing has obviously been done with care. We look forward to seeing the remaining volumes.

Charles Wilcocks

BOOK REVIEWS

FAIRLEY, Neil Hamilton [K.B.E., M.D., D.Sc., F.R.C.P., F.R.A.C.P., D.T.M. & H., F.R.S.], WOODRUFF, A. W. [M.D., Ph.D., F.R.C.P., D.T.M. & H.] & WALTERS, J. H. [M.D, F.R.C.P.]. **Recent Advances in Tropical Medicine.** 3rd Edition. pp. viii + 480, 15 illustrations. 1961. London: J. & A. Churchill Ltd., 104, Gloucester Place, W.1. [50s.]

The last edition of this work appeared under the editorship of Sir Leonard ROGERS [this *Bulletin*, 1929, v. 26, 953]. The 30-odd years that have since elapsed have seen really tremendous advances in knowledge in all branches of medicine, and by no means least in that branch with which this volume is concerned. The present authors have divided between themselves the subjects covered, and the contributions of each appear over the appropriate signatures. The contents are not divided into chapters but are grouped under several headings. Starting with the protozoal diseases there follow sections on the helminthic and bacterial, the spirochaetal and leptospiral, the virus and the rickettsial, and the fungal diseases; there are further sections on short-term fevers, the venereal diseases, nutritional diseases and anaemia, the hereditary disorders, and finally on diseases of uncertain origin. In each section there may be contributions by one or more of the authors. At the end of each signed contribution there is a pertinent bibliography; there are a few figures and illustrations, and the book ends with an adequate index.

In a work of this type there must be some danger of the mere listing of abstracts already published in one or other of the invaluable abstracting journals, to which the contributors properly express their indebtedness in the preface. With few exceptions this tendency has been resisted most effectively. In consequence this book gives a readable and concise account of the advances in knowledge of each of the various conditions dealt with and of their significance.

In view of the steady progress still taking place in the fields covered, and of the time which must elapse between the production of a manuscript and its appearance in print, there are additions which now could be made to the text in various sections. Publication of the extensive work on filariasis undertaken in Malaya was possibly too late for notice in this volume; but its importance in the study of the epidemiology of filariasis, if in no other connexion, is such that reference to it cannot be omitted in later editions of this and indeed of other works concerned with any aspect of filariasis. In sprue, new methods for biopsy of the jejunum have revealed the presence of changes in the villi of its mucosa which are thought to be characteristic of the condition and significant in its pathology; the adoption of such techniques has resolved many of the doubts which arose from the examination of material previously obtainable only at autopsy. Among the helminth diseases the importance to public health throughout the Far East of paragonimiasis and of clonorchiasis, with the material increase in understanding of the lesions due to the former condition and of the means for their relief, might now be considered worthy of mention.

Perhaps more especially in treatment is the picture changing so rapidly today. The antibiotic paromomycin may prove to be a significant entrant into the ranks of the true amoebicides, and very recent reports suggest that this is indeed the case. In trypanosomiasis the introduction of the water-soluble melaminyl

compound Mel W, which is claimed to be much less toxic than Mel B, likewise may be of importance; and probably of much greater value is the introduction of nitrofurazone, which shows particular promise as a therapeutic agent in trypanosomiasis by virtue of its action on strains of trypanosomes which have become refractory to all the previously recognized trypanocidal drugs, including Mel B. In schistosomiasis, likewise, the melaminyl compound TWSb (antimony dimercaptosuccinate) is said to be significantly superior in certain respects, notably in its diminished toxicity, to the older antimonials at present used in treatment of this condition. If only on account of its lesser toxicity the period necessary for treatment with TWSb can be shortened materially; this may prove to be of very great importance in the conduct of mass treatment campaigns among backward peoples.

Into so compendious a volume, albeit small in bulk, some errors must creep. Some of those noticed are: on p. 130, in the bibliography, the name Laurie—which should be Lourie; on p. 315, and elsewhere, the name of the young woman from whom the avianized strain of rabies virus derived should be Flury, and not as spelt. The accepted full dosage of diaminodiphenyl sulphone for leprosy (p. 263) is 300 mgm. twice weekly—not 100 mgm. twice weekly as stated. But these are matters of very minor moment. Errors are remarkably few.

The reviewer has read this book with very considerable interest and with great personal profit. He can strongly recommend it as a work of solid value to all those working on tropical medicine either in the field or in a more restricted sphere. It provides in condensed form information which, without it, would have to be sought with a very vexatious expenditure of time and effort from literature gathered from all over the world. Of convenient size and well produced it should find a place on the desks of English-speaking workers in many parts of the world. *A. R. D. Adams*

GROBER, J. **Wärmestauung und Schwülekrankheiten. Entstehung, Verlauf. Behandlung und Verhütung für Arzte und Hygienetechniker.** [Heat Congestion and "Sultriness Diseases". Origin, Course, Treatment and Prevention] pp. viii+200, 2 figs. 1960. Stuttgart S: Gustav Fischer Verlag, Stafflenbergstr. 36, Schliessfach 431, Germany. [DM 28.–]

In a somewhat complicated text the author reviews the scientific and practical aspects of heat balance in man in health and disease. He considers the situation from the medical and hygienic points of view in infectious disease, tropical disease, occupational circumstances including mining and in hydro- and thermotherapy. He regards the various forms of "heat stroke" as merely the more pronounced forms of a very wide range of syndromes attributable to the effects of moist, warm atmospheric conditions. For these syndromes he uses the word *Schwülekrankheiten*, literally "sultriness sicknesses", a term covering many conditions not previously related to environmental hazards. These in their most severe forms are well-known clinical entities, such as heat exhaustion and heat stroke; in their minor grades they may not be prominent clinically but are commonly responsible for serious degradation in individual economic and mental efficiency.

The book is set out as follows.

The first chapter refers to the conception of *Schwülekrankheiten* in relation to meteorology and seasons, physiology, human sweat secretion and subjective sensations and objective processes. A chapter on heat congestion follows. The subject is then considered in a series of sections covering therapeutic hot environments (including hot water therapy and the Finnish Sauna) and the prevention of heat damage (including general and specific problems such as geographical zones, clothing, housing, nutrition, etc.). The final chapter is devoted to treatment of heat illnesses, including " heat stroke ".

The book ends with very short summaries of the author's scientific and practical conclusions and some suggestions for future research.

In many respects the contents of the book cover familiar ground. Thus the author considers that the overall effects of a warm, moist environment are best estimated by calculating from the relevant temperature, relative humidity and air movement, the " effective temperature ", which represents the temperature of a still atmosphere of given humidity which produces the same feelings of warmth or cold as do the conditions under examination. So far, this concept is the most satisfactory form of notation, but it excludes the significance of infra-red radiation. [This is normally allowed for in calculating the " corrected " effective temperature, by using the globe instead of the dry temperature.]

In some contexts the author differs from the standard approach to these problems. This is particularly notable in the classification of the more obvious clinical effects of hot environments, especially in regard to " heat stroke ". He divides this into clinical groups, some of the milder of which overlap accepted forms of " heat exhaustion ". According to the author severe cases of " heat stroke " may present as asphyxial, uraemic, hyperpyrexial and congestive syndromes. The asphyxial condition is very severe, with rapidly developing lung involvement and cyanosis, cold limbs but otherwise high skin (and internal) temperature. The uraemic form affects the sweat secretion and kidney function, often from the beginning, and is associated with clonic muscle cramps involving the whole body, even in cases where there is no obvious NaCl imbalance. The hyperpyrexial syndrome described by the author corresponds roughly to the classical picture of heat hyperpyrexia. (He suggests that radiant energy may be involved in its synthesis.) The congestive syndrome is deduced from autopsy findings. Although in his summary the author stresses the importance of closer study of sweating in people exposed to heat, the state of sweating in the above syndromes is not mentioned in detail.

[The reviewer considers that this hyperpyrexial syndrome is heat hyperpyrexia and that the other so-called syndromes are probably merely complicated forms of this syndrome.]

The author attempts with some success to be practical and pragmatic. He makes a useful point in suggesting that the examination of reactions in a laboratory hot room should help to decide whether a particular person is adaptable or non-adaptable to hot environments, whether natural or artificial. The possible influence of ethnological and geographical factors in acclimatization to heat are also discussed.

The book is interesting, instructive and well documented. It has a much wider range than most of its kind. *B. G. Maegraith*

INDIA, GOVERNMENT OF: MINISTRY OF HEALTH. **The Directory of Hospitals in India.** 778 pp. 1960. New Delhi: Directorate General of Health Services. [Rs. 10.0 nP; 16s.]

INDIA, GOVERNMENT OF: MINISTRY OF HEALTH. **Specialised Treatment Centres in India.** pp. vi + 141. 1959. New Delhi: Directorate General of Health Services.

These two publications are complementary and show the position which existed in 1957.

The Directory, for which only 3 States failed to supply information, provides in compact form details which would not easily be obtained outside India. It contains a list of hospitals, arranged in alphabetical order of States and Districts, showing the population served, departments, numbers of beds, staff strengths, annual budgets and the facilities available at the time of compilation. This section (pages 165–711 and 776–778) is preceded by an analysis, in the same sequence, of hospitals by title, departments, total beds and whether Government, municipal or private. Training schools in nursing are listed in another section and 3 pages are devoted to hospital statistics (by States only).

The guide to specialized treatment centres deals with those institutions which are concerned with cancer, the eye, leprosy, rabies, tuberculosis and venereal diseases. *A. H. Phipps*

NOTICE

Consideration has from time to time been given to the question whether it would be desirable to include authors' addresses in the headings of abstracts in the *Bulletins* and it has been decided that the additional time and cost involved would not be justified. Subscribers are advised, however, that the Bureau will, on request, notify them of the name and address of the author of the article, or the publisher of the journal, from which an abstract has been made.

The Bureau also deals with enquiries from individual subscribers relating to abstracts which have appeared in the *Tropical Diseases Bulletin* and the *Bulletin of Hygiene*; correct references and the exact nature of the information required should be stated.

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